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Determinants that Influence Citizen's Usage of Different E-Government Services: A Malaysian Case Study

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Abstract

For the past two decades, e-government has become a part of government's development programmes throughout the world. With the availability of e-government, public services can be accessed 24 hours a day, 7 days a week. Governments have put a lot of resources into implementing e-government platforms. Technology adoption scholars have paid serious attention towards understanding the factors that influence citizens' usage of online services. However, despite the enormous research efforts that have been put forth and the use of e-government services that has been examined widely, e-government services offered by the government agencies often remain underutilised. Malaysia has successful cases of implementing e-government services. However, a recent study about e-government adoption in Malaysia indicated that it was growing slowly with a low rate of adoption. Moreover, several studies also found that citizens were more likely to use e-information services than e-payment services, even with both services were offered online in the same webpage. As such, it is reasonable for this study to understand the reasons e-information usage was higher compared to e-payment services in e-government services.

Evidence demonstrates that the Unified Theory of Acceptance and Use of Technology (UTAUT) conceptual model has been successfully employed to explain technology adoption by citizens. Furthermore, the predictors in these models have been validated by prior studies in various settings. By considering a variety of types and levels of e-government services, the present study is significant in that it examines the citizens' attitudes towards different e-government system use. Thus, this study was conducted with the aim to identify the predictor factors in the usage of different e-government services and functions by: i) examining the main factors that influence usage of different e-government services (i.e., income tax, property tax, and traffic fines); and ii) identifying the factors leading to the usage between e-informational and e-payment services.

This study involved two stages. First, interviews with participants that had used government online services were undertaken as a scoping study to get opinion about citizens' attitudes about using e-government services. After using a template analysis, five factors were identified to be relevant in the Malaysian context: Relative Advantage; Effort Expectancy; Social Influence; Perceived Trust; and Perceived Risk. Following from the scoping study, the UTAUT model was modified for this study.

The second stage involved a web-based survey to collect data from 294 Malaysian citizens in Selangor who had used at least one e-government service in the past two years. As the main objective of this study was to identify the factors associated with technology use, multiple linear regressions were utilised. Statistical software package STATA version 14 was used to analyse the relationship between the predictors and the outcome variables. As the main objective of this study was to identify the drivers of technology adoption, regression analyses were utilised. As the study involved six different e-government services, the research findings provided varied results according to the type of services.

This study confirmed that Effort Expectancy was found to be the most common factor associated with e-government usage for all services under study. This implied that the ease of use and easy to learn of e-services was found to be relevant reasons for citizens to use the service. The findings also show that Perceived Risk was consistently associated with e-services usage, and indicating that this factor was also common in explaining the citizens' usage on e-government services. Finally, as the newest service, the traffic fines system use was associated with Social Influence and Relative Advantage factors, indicating that peers' opinions and citizens perceived on the benefits of the online service are important to attract citizens to use the online service.

In addition, research findings identified differences in drivers between e-information and e-payment services. For e-information, Effort Expectancy and Perceived Risk were identified as dominant factors associated with the citizen's usage for both type of e-services. While, Relative Advantage and Social Influence were also identified to be associated with traffic fines services. For e-payment services, interestingly, the effect of the factors that influenced the citizens' usage of e-government services were slightly different with e-information service. Besides the Effort Expectancy and Social Influence factors, Relative Advantage also was found to be associated but in selected e-services.

The current study has significant empirical and practical contributions. Empirically, it contributes to the body of knowledge as this study provides a model that explains the different determinants of different e-services usage by citizens. Further, by integrating the UTAUT model with new constructs retrieved from a scoping study, a variation of citizens' usage in different settings of systems were identified. As practical implications, the research identified the main determinants leading to users to adopt e-government services. Furthermore, due to

limited resources, it is crucial for governments in developing countries to understand the important determinants that lead to the usage of e-government services.

Declaration by author

This thesis is composed of my original work, and contains no material previously published or written by another person except where due reference has been made in the text. I have clearly stated the contribution by others to jointly-authored works that I have included in my thesis.

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Publications during candidature

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Contributor	Statement of contribution
Muslimin Wallang (Candidate)	Designed experiments (60%) Wrote the paper (70%)
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Keywords

E-government, determinants, information, technology, adoption, usage, behavioural, UTAUT, citizens, Malaysia

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List of Abbreviations used in the Thesis

AVE	: Average Variance Extracted
DOI	: Diffusion of Innovations
e-government	: Electronic Government
G2B	: Government to Business
G2C	: Government to Citizen
G2G	: Government to Government
ICT	: Information Communication and Technology
IRBM	: Inland Revenue Board of Malaysia
IS	: Information System
MAMPU	: Malaysian Administative Modernization and Management Planning Unit
MAR	: Missing at Random
MSC	: Multimedia Super Corridor
MyEG	: E-Government Services Portal
NHMRC	: The National Health and Medical Research Council
OPCRS	: Online Permanent Account Number Card Registration System
PAF	: Principal Axis Factoring
PCA	: Principal Component Analysis
SLGGA	: Smart Local Government Governance Agenda
TAM	: Technology Acceptance Model
TPB	: Theory of Planned Behaviour
TRA	: Theory of Reasoned Action
UMEGA	: Unified Model of E-Government Adoption
UN	: United Nations
UNASPA	: The United Nations and American Society for Public Administration
UTAUT	: Unified Theory of Acceptance and Use of Technology
UUM	: Universiti Utara Malaysia

Chapter 1 : Introduction

1.1 Background of Study

E-government has become a part of governments' development programmes throughout the world. The term "e-government" describes the use of electronic information and communication technologies (ICTs) to support government operations and to interact with citizens through "government to citizen" (G2C) initiatives (Wang & Liao, 2008; Scholl, 2003; World Bank, 2007), to provide services to businesses through "government to business" (G2B) initiatives (Brown & Brudney, 2004; United Nations, 2005; Seifert & Petersen, 2002), and to achieve more efficient operations between government agencies through "government to government" (G2G) initiatives (Carter & Belanger, 2005; Seifert, 2008; Fang, 2002). With the availability of e-government, online public services can be accessed 24 hours a day, 7 days a week. Despite the e-government still being in its infancy, this topic has become popular and attracted the attention of many scholars, political leaders, and policy makers around the world (Chen, Chen, Huang, & Ching, 2006). Several potential benefits of e-government have been identified in the literature, including increasing a citizen-centric engagement (Alsaghier, Ford, Nguyen, & Hexel, 2009), improving access to public services (Heath, 2000), and increasing citizen confidence in government services (Warkentin, Gefen, Pavlou, & Rose, 2002).

Previous studies have reported that there are similar usage patterns by citizens on e-government adoption in developing and developed countries (Dada, 2006; Shareef, Archer, Sharan, & Kumar, 2010). The consistency between the results of these studies shows how important it is for governments to build a reliable, user-friendly, and secure system. Thus, the number of governments that use e-government applications for delivering their services has increased rapidly regardless of federal, state, or local authority level. Indeed, improving the efficiency and effectiveness of government services is the top agenda for every government agency, as well as to ensure citizens' adoption of e-government services for a greater return for the huge investment outlaid by government. However, the adoption of these e-government services by the public is often slow and the services underutilised (Mohd Idris, 2016; Mohsin & Raha, 2007; Weerakkody, Dwivedi, Brooks, Williams, & Mwange, 2007). The issue of whether the citizens will embrace new technological procedures and initiatives taken by the government is a question of both academic and practical nature. Since the factors that influence citizens' actual usage of different e-government settings have not been well understood, this dissertation

aims to contribute to e-government research by understanding the determinants that influence citizens' usage of different types of e-government services.

In Malaysia, several ICT master plans have been introduced by the Malaysian government to prepare for the transformation of public services to e-services. Among the master plans are the Eighth Malaysia Plan (2001–2005), the Knowledge-based Economy Master Plan (2002–2010), the Public Sector ICT Master Plan (2003), and the Ninth Malaysia Plan (2006–2010). These initiatives have positioned Malaysia as one of the top five developing countries on the e-readiness index (WASEDA, 2012), one of the top ten Asian countries on the e-government index, and fortieth among the 193 member countries of the United Nations (United Nations, 2014). Malaysia is grouped among the 25 emerging leaders in the e-government development, close behind the top 20 developed countries. Moreover, in some contexts, Malaysia performs better compared to some developed countries. For example, the Internet penetration rate in Malaysia is considered high (60.7%), higher than both Italy (58.4%) and Greece (53%) (United Nations, 2012). Therefore, if the Malaysian government is really concerned about their investment on IT-related expenditure, they need to implement e-government projects carefully to avoid implementation failure and wasted resources.

1.2 Problem Statement

Governments have put a lot of effort and money into implementing e-government platforms as well as to meet the increasing expectations of citizens (Horst, Kuttschreuter, & Gutteling, 2007). Many government agencies have realised the importance of using the Internet as a medium to improve their services to the public (Sheridan & Riley, 2006), and Malaysia is not an exception to this trend. Initially, digitising documents and moving to paperless government operations were a key to an e-government initiative. Through e-government, most services are available online and can be accessed at any time. Malaysia has shown successful cases of implementing e-government services whereby income tax payments and declarations can be accessed electronically through e-filing (Rotchanakitumnuai, 2008).

Scholars have asserted that the success of government to citizen e-services depends on strong demand and support from citizens (Aldrich, Bertot, & McClure, 2002; Luna-Reyes & Gil-Garcia, 2011; Parajuli, 2007), while several other authors mentioned that the benefits of e-government depend on the number of citizens that use the services (Ebrahim & Irani, 2005; Hung, Chang, & Yu, 2006; Mohsin & Raha, 2007; Warkentin, Gefen, Pavlou, & Rose, 2002).

However, despite all the efforts and predicted benefits, e-government services offered by government agencies often remain underutilised by most citizens (Mahbob, Nordin, Salman, Sulaiman, & Abdullah, 2011; Weerakkody et al., 2007). In fact, previous studies have shown that citizens did not utilise e-government services fully, even in the countries that are leading in the UN's e-government rankings, such as Australia and the UK (Mohd Idris, Kasimin, & Sahari, 2011). A study about e-government adoption in Malaysia indicated that e-government use by the citizens was growing, but at a slow pace (Mohd Idris et al., 2011; Mohsin & Raha, 2007) and a low rate of adoption failed to reach the targeted critical mass (Siti Hajar, 2016).

Although the use of e-government services by citizens has been widely examined, the differential usage of e-government services by the citizens has not yet been examined in the one study. Detection of the factors that hinder to the use of e-government services is important for the improvement of e-government adoption. Dorasamy, Marimuthu, Raman and Kaliannan (2010) studied the adoption of e-filing in Malaysia, focusing on the Klang Valley[1]. The researchers surveyed a small sample of randomly selected taxpayer citizens. Based on the TAM and DOI models, the findings revealed to in order to attract users to use e-filing, it was not enough to develop a useful system without taking care of the behavioural part of the users. Therefore, this present study was conducted with the aim to identify the main determinants influencing citizens' usage of e-government, besides the overall aims to optimise the successful implementation of e-government and to ensure the resources and costs were not expended in vain.

A key challenge in the implementation of e-government in developing countries is not merely the technology. Instead, the success of e-government is also determined by whether citizens use the services or not (Gautrin, 2004; Kumar, Mukerji, Butt, & Persaud, 2007). Therefore, in recent years, many scholars have conducted studies to understand how and why users utilise electronic commerce (e-commerce) services (Al-zoubi, Thi, & Lim, 2011; Faruq Muhammad Abubakar & Ahmad, 2013; Nurdin, Stockdale, & Scheepers, 2011). A study reported visiting the counter to get government services was more preferred and was still a practice in developing countries (Alshawi & Alalwany, 2009). Several studies on G2C found that people

[1] Klang Valley is an area with the most extensive and fast-growing Internet coverage in Malaysia (MAMPU, 2007).

were more likely to use e-information services than e-transaction services; they were satisfied to get information from the Internet, but were reluctant to use it for more advanced processes such as paying bills and taxes (Alateyah, Crowder, & Wills, 2012; Gauld & Goldfinch, 2006). In Malaysia, a study by Mahbob et al. (2011) showed that people were more satisfied with manual methods when dealing with the government agencies. In addition, the authors also found the respondents used e-government to check summonses for driving violations, but not to make payments. Similarly, the Inland Revenue Board of Malaysia (2012) reported that the collection of fines over-the-counter (US$3.4 million) was more than the online method (US$118, 253). As such, it is reasonable for the government to understand the reasons e-information usage was higher compared to e-payment services in almost all the e-government services, which is what this study will investigate.

The literature demonstrates that conceptual models of technology acceptance, including the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT), have been employed to explain technology adoption by citizens (Alawadhi & Morris, 2008; Al-Sobhi et al., 2009; Wu, Tao & Yang, 2008; Yu, 2012). However, as suggested by and more recently by Rana and colleagues (Dwivedi et al., 2017; Rana & Dwivedi, 2015; Rana, Dwivedi, Lal, Williams, & Clement, 2017; Rana, Dwivedi, & Williams, 2013; Rana, Dwivedi, Williams, & Weerakkody, 2016; Williams, Nripendra, Dwiyedi, & Banita, 2011) further work should be conducted beyond the boundaries of these existing models, as additional factors and integrated models may lead to a better understanding of usage behaviour. For this study, the UTAUT model was adopted as an initial theory to examine the citizens' usage of e-government services but was extended through a scoping study for new drivers of adoption. In this regard, the current study aimed to fill this gap by integrating the UTAUT model with several other factors that were identified from the technology adoption literature in order to provide a more complete picture of the factors influencing the adoption of e-government services. An intensive review of the literature was unable to locate any studies that have developed the technology use model based on different e-government services. This study was therefore conducted to examine the factors determining the citizens' usage of different e-government services in Malaysia.

1.3 Scope of the Study

Public service delivery through e-government involves demand (citizen) and supply (government) to be successful. Previous studies have shown that each side can face obstacles

and challenges that may impede the success of e-government (Ebrahim & Irani, 2005; Lam, 2005; Roushdy, 2012). Poor infrastructure that leads to a digital divide, limited finance, poor data systems and capability, as well as a lack of skilled personnel have been identified as among the barriers from the supply side (Heeks, 2006). On the demand side, most of the limitations are related to issues of user satisfaction (Islam, Muhd Yusuf, Yusoff, & Johari, 2012), perceived risk and trust (Alomari, Sandhu, & Woods, 2010; Carter & Bélanger, 2005) and lack of awareness (Mahbob et al., 2011).

This study focuses on understanding citizens' differential usage of different e-government services. For the purpose of this study, technology adoption by a citizen is defined as the use of the particular technology that supports the process of using public services (Yavuz, 2010). Meanwhile, technology is defined as any Internet-based service (either on computer or mobile phone) that can be used to interact with the government. The United Nations (2008) identifies five stages of the e-government maturity index. These stages include (i) emerging, (ii) enhanced, (iii) interactive, (iv) transaction, and (v) connected. The first stage is a basic form of e-government that provides information on official government websites. The government agencies provide policies that relate to the public-government engagement on the second stage. The third stage involves two-way communication where citizens communicate electronically, for example, with the valid user ID. Through a portal, the citizens can make a request and check their traffic fines. At this stage, the government agency also provides downloadable forms to obtain information concerning the citizens' needs. In the fourth stage, both citizens and government are involved in online transactions. In the last stage, different levels of government agencies are connected and integrated through a single website or an e-government portal. However, in order to explain the different models of e-government implementation, the current model presents five phases in the growth of e-government, namely web presence, one-way interaction, two-way interaction, transaction, and service integration (Al-Nuaim, 2011).

Based on Al-Nuaim's model, the two-way interaction and the transaction phases were chosen to examine the different usage of e-government by the citizens. Thus, the level of e-government involved in this study refers to the interactive (information) and transaction (payment) services. The study involved studying these two service modes in three service areas. Two of the service area were offered by the federal government (income tax and traffic fines), and the third service (property tax) was offered by the local authorities. As the objective of this study was to identify the key factors associated with citizens' different use of e-government services, the main

criterion was that the respondents were currently using or had used any e-government services in the last two years. Therefore, the people who had not used any e-government services were excluded.

1.4 Research Objectives

The study empirically tested the factors determining e-government usage on different types of services in Malaysia. In this study, possible factors that drove e-government usage were initially derived from the UTAUT model. These factors were then expanded to include several factors widely discussed in the technology adoption literature, based on a scoping study.

More specifically, the research objectives were as follows:

1. To examine the key factors that influence citizens' use of different types of e-government services (i.e., income tax, property tax, and traffic fine).

2. To extend the understanding of the factors that influenced the different use of e-government level of services (information and payment).

Based on the objectives mentioned above, the following research questions were considered:

1. What are the factors associated with citizens' usage of various e-government systems (i.e., income tax, property tax, and traffic fines)?

2. What are the factors associated with citizens' usage of different types e-government process (i.e., information versus payment)?

1.5 Contribution of the Study

This study is significant in terms of its contribution to the theoretical and practical perspectives. At the heart of this research is a model that seek to understand and predict e-government use by the citizens, UTAUT. Many scholars agree that the existing theories on technology adoption have successfully contributed to the understanding on e-government use (Al-shafi & Weerakkody, 2010; Lu, Huang, & Lo, 2010; West, 2004; Yaghoubi, Kord, & Shakeri, 2010). However, typically these models only deal with predictions of a single e-government service and do not compare different systems, and thus do explain the variations of usage in e-government services (Al-shafi & Weerakkody, 2010; Hung et al., 2006; Rahman, Jamaludin,

& Mahmud, 2011; Yu, 2012). To fill this gap, this study contributes to e-government literature by addressing the drivers of citizens' different usage of different e-government services. In general, the findings of this study will shed light on the reasons citizens choose to use some e-government services and not others. Additionally, by identifying the key elements associated with the citizens' usage on e-government services, such as Relative Advantage, Effort Expectancy, Social Influence, Perceived Trust, and Perceived Risk, it can assist respective government agencies as they solicit and operate the e-government services. Indeed, by considering a wide range of types and levels of e-government services, the findings from this study are expected to contribute to the existing literature on technology adoption.

In addition, the findings of this study will also have practical implications for e-government design and deployment particularly for the Malaysian government. The study is likely to identify the main determinants leading to users' decisions making to adopting different e-government services. As stated before, the adoption rate of e-government services in most developing countries is very low. Thus, by identifying these main determinants, it could bring out a new dimension in the e-government implementation. Most governments of the developing countries have limited resources, and thus the success of e-government is a must for them to ensure that these resources are allocated and spent wisely and needlessly wasted.

1.6 An Overview of E-government in Malaysia

The Internet was introduced in Malaysia in 1987 by the Institute Malaysia Microelectronic Systems (MIMOS). With the National Information Technology Council (NITC), MIMOS is responsible to ensure that the national ICT agenda can be implemented successfully (Salman, 2011). MIMOS plays major roles in the formulation and operation of the Malaysian ICT initiative, which is to establish in the country the innovative use of ICT and to accelerate Malaysia's growth to become a developed nation by 2020. The Multimedia Super Corridor (MSC) was launched in 1996 to ensure that this goal can be achieved. In general, the implementation of MSC is divided into three phases from 1996 to 2020.

In the first phase (1996–2003), MSC was successfully created, and it focused on attracting a core group of world-class companies. As a result, five cyber-cities were developed with more than 1,000 companies and 22,000 jobs created with a total worth of RM6 billion, and seven flagship MSC applications were also launched. These applications were Electronic Government, Multipurpose Smart Card, Smart School, Telehealth, R&D group, e-business,

and Technopreneur Development. In the second phase (2004–2010), MSC focused on government agencies being more interactive, enhancing local ICT industry, increasing the use and adoption of innovative domestic ICT products and services, as well as giving priority to at least four or five intelligent cities that will be linked to the cities around the world. In the third phase (2011–2020), it is expected that there will be 12 intelligent cities that will be linked to the global information superhighway. The public will be transformed into a knowledge-based society, and Cybercourt Justice will be established.

In the 1980's, the Malaysian government introduced a public-sector reform to improve its efficiency and effectiveness. Consequently, the use of ICT in the public sector in Malaysia has grown rapidly. According to Moon and Norris (2005), the reform of public services has become synonymous with the Internet. As a result, many local authorities have seen this scenario as a part of the new wave in the public-sector reform (Lapsley & Pallot, 2000). Initiatives including Privatisation, Total Quality Management, Malaysia Incorporated, Customer Charter, ISO 9000 Quality Management Standard, and Online Service have substantially increased the public sector in Malaysia in terms of the quality of services. Public sector reform in Malaysia has been influenced by American and European practices (Hazman Shah & Kaliannan, 2008).

The path towards Vision 2020 and developed nation status by 2020 has been demonstrated in the five-year Malaysia Plan and the ten-year Perspective Plan (OPP). Economic development is seen as the main catalyst in determining the success of Vision 2020. Therefore, the government aims to use ICT as the key factor to maximise the capabilities of the public sector. The government has also launched the Public Sector ICT Strategic Plan to ensure that the ICT initiatives taken will be in line with the Public Sector ICT Vision. For this purpose, the government has introduced various several of ICT plans such as those found in the Eighth Malaysia Plan (2001–2005), Knowledge-based Economy Master Plan (2002–2010), Public Sector ICT Master Plan (2003), and the Ninth Malaysia Plan (2006–2010) (Abdullah Hazman & Kaliannan, 2008).

The vision of the Malaysian government is to build e-government initiatives to serve the citizens better and to lead towards the new knowledge-based economy. The vision focuses on delivering services from government to citizens and enabling the government to become more efficient in serving the public needs. There are seven pilot projects of the Electronic Government Flagship Application as presented in Table 2-6.

Table 1-1: List of pilot projects of the electronic government flagship application

Project	Purpose	Category
E-Services	• To facilitate transaction through online portals. • To avoid people from queuing up at the counter to make payment. • To avoid traffic congestion. • To reduce bureaucratic hassles.	Government to Citizen
E-Syariah	• A system developed for the management of the Syariah Court/Islamic law cases. • To improve productivity and efficiency of the management of Syariah courts across the country.	
Electronic Labour Exchange (ELX)	• This application is supervised by the Ministry of Human Resources. • It provides a platform for employers and job seekers to interact. • It aims to become a reference centre for labour market information.	
E-Procurement	• A platform for suppliers to sell goods and services to the Government through the Internet. • Suppliers advertise their products and submit their pricing policy, process orders, and deliveries.	Government to Business
Human Resource Management Information System (HRMIS)	• It is developed to prepare the civil servants with the challenges of K-economy, the provision of HR data for the development of more efficient staffs. • Effective staffing and right-sizing of civil servant. • Open system that offers better communication, streamlined processes, and one-stop access.	Government to Government
	• More effective document management that facilitates the exchange of documents	

Generic Office Environment (GOE)	between public agencies, with emphasis on secure and traceable documents. • It is completely web-based and has been developed according to government requests.	
Project Monitoring System	• Online system that controls the entire progress of national programmes/projects. • The government will monitor the implementation of the project for approval of implementation, mid-term review, and completion. • As a platform to exchange ideas and to demonstrate the best practice models in project implementation.	

Source: Malaysian Administrative Modernisation and Management Planning Unit (1997)

1.7 Thesis Outline

This thesis is organised into six chapters. Chapter 1 begins with the background and the scope of the research. The problem statements of the study are then presented. It was followed by the objectives and research questions of the study. Finally, the contributions of the research are then explained.

Chapter 2 provides the literature review. It first discusses the conceptualisation of e-government usage. At the heart of this body of research is a conceptual model that seeks to understand the citizens' use of e-government services. From the extant literature, several variables are also identified as possible predictors of e-government services in Malaysia. The actual usage of e-government service is considered to be the dependent variable, while other factors identified are deemed as the independent variables. The chapter ends with an initial conceptual framework for the study.

In Chapter 3, the research design is discussed. The study involved two stages: a scoping study and a survey. In order to better understand the context of how Malaysian citizens determine their use of different types of e-government services, a scoping study was undertaken. The purposes of the scoping study were to get a clear picture of the issues under investigation and to assess if the current issues covered in the literature about usage and non-usage of e-government services were adequately addressed in the Malaysian context. Interviews were conducted with twelve participants who had recently used any e-government services. The findings were taken in the second stage, and the regression analysis was used for testing the

proposed predictors. The chapter also presents the ethical consideration of both of data collection procedures.

In Chapter 4, the results of the scoping study are outlined and discussed. A template analysis was employed to analyse the interview data. This technique was used because it provided a way to manage unorganised data for discovering the themes in the data and to show potential matching up of participants' views. Based on the results of the scoping study, the constructs from the UTAUT model that were consistent with the interview are reported in this chapter. This discussion was followed by reporting new constructs identified, namely Perceived Risk and Perceived Trust. Also, the findings were then used to revise the conceptual model and then used to generate the survey instruments in the second stage.

In Chapter 5, the revised model was then tested and validated by using a statistical analysis of responses from the online survey. The statistical analysis was conducted using multivariate regression analysis to identify the major factors associated with the outcome variables for all six e-services. The chapter ends with an overview of the survey results, and all the research questions and hypotheses were addressed.

Lastly, discussion of the findings is provided in Chapter 6. The empirical and practical contributions are presented. The chapter also highlights the limitations of this study. The guidelines for the future study are also provided in this final chapter.

1.8 Chapter Summary

This chapter has outlined the foundation for this study. First, it explained the background of the study. The problem statement and scope of the study were then presented. The research objective and questions are clearly identified. The potential contribution to the theoretical and practical perspectives were addressed, and the thesis outline was described briefly. Next chapter presents the existing literature review in order to understand the drivers that influence citizen's use of different e-government services.

Chapter 2 : Literature Review

2.1 Introduction

The present study examined the factors that influence an individual's use of different e-government services. Therefore, it is necessary to understand the concept and context of e-government, how the government operates, and the reaction of the citizens towards the delivery of the services.

This chapter is divided into twelve main sections. The first section provides a definition of e-government and it was followed by an overview of the e-government concept and the context of e-government. This is followed by an overview of the maturity of e-government services. Section 2.5 discusses the conceptual models of technology adoption. This section explains the models that are widely used by the studies in the information system field. Section 2.6 elaborates the variables that are frequently used in previous studies. The studies applying the UTAUT model are discussed in Section 2.7. Section 2.8 presents the previous e-government studies conducted in Malaysia. This section discusses the underpinning models and constructs that are regularly used to explain technology adoption in Malaysia. The following section elaborates e-government practice in Malaysia. Finally, the last section summarises the chapter.

2.2 Definition of E-government

A research on electronic government, or simply "e-government", is still relatively new and thus the term "electronic government" is sometimes confusing. According to Bhatnagar (2004), there is no one commonly accepted definition for the term. However, it could be said that the definitions vary depending on the perspective of the person who defines the term. In general, the term e-government can be defined as follows:

- The use of electronic information and communication technologies (ICTs) by the government to support government operations, to transform relations with citizens, to provide services to businesses, and to upgrade government operations within government agencies (Carter & Belanger, 2005); or

- The interaction with citizens using multiple channels[2] of electronic information technology (IT) tools to allow the public to get easy access to the government agencies (World Bank, 2009); or
- The use of technology by government agencies to build a network structure for electronic service delivery where efficiency and transparency could be priority (Yildiz, 2007).

More broadly, e-government is also seen as a technology that allows the government agencies to share data and decision making. This technology challenges traditional approaches in service delivery and the role of government (Chadwick & May, 2003). In a similar manner, e-government initiatives all over the world endeavour to integrate information and communication technologies to transform the delivery of government services to their stakeholders, citizens, and intergovernmental agencies by improving the quality of services, accountability, and efficiency.

Although there are various definitions of e-government, for the purposes of this study, the term "e-government" refers to the delivery of government services via the Internet, in an effort to improve the interaction between government and citizens.

2.3 Types of E-government

The type of e-government is determined by the actors that are involved in relation to the government. Three main categories are identified in the literature, namely Government to Citizen (G2C), Government to Government (G2G), and Government to Business (G2B).

G2C involves the ability of government and citizen to communicate efficiently using electronic methods. G2C invlove putting government services online (Alateyah et al., 2012), so they can be quickly accessed and payments made fast (Chang, Wang, & Yang, 2009). Citizens can also be informed about government laws, regulations, policies, and services faster (Kardaras & Papathanassiou, 2008). One of the design aims of G2C is to facilitate citizens' interactions with the government via a one-stop centre where all the government websites can be accessed

[2] The term "channel" refers to the medium that the citizens use to interact with the government, such as the Internet, phone call, and physical facilities (counter).

through a central website or portal. A study on one of the Malaysian e-government flagships involved citizens from various demographics, and showed the government portal was perceived as a useful one-stop centre (Yahya, Nadzar, & Abd Rahman, 2011). Similarly, www.gobenefits.gov, which is an American single-point government website, was found to be successful in facilitating the procedure for driving licence renewals for the citizens (Pizzella, 2005). G2C initiatives have been linked with several facilities such as driving licence renewals, tax payments, paying for parking tickets, job applications, paying taxes, paying traffic fines, health and hospital information, provision of extensive information on education, security, and interaction with elected members.

G2B is about the interaction between the government and the business community in a web environment. G2B applications relate to registering business, renewing licences, downloading application forms, transactions online, and paying taxes and e-procurement. This interaction allows governments to purchase items and to pay invoices in a simple way and helps the government to conduct a business with private agencies (Evans & Yen, 2006).

G2G refers to internal interaction between government agencies. The main objective of this category is to integrate the collaboration and coordination among central, state, and local governments and agencies. The interaction allows the government agencies to improve their efficiency by eliminating redundancy and duplication of tasks. For example, an intergovernmental collaboration among different governments in homeland security agencies provides a quick response system when dealing with the crime scene (Evans & Yen, 2006). The introduction of electronic government is also seen as a driver to improve the services that involve the interactions among the government, citizens, and businesses. According to Abdullah Hazman Shah and Kaliannan (2008), ICT is seen as a medium to improve the method of service delivery. Simultaneously, it will improve information flows and processes within the government agencies as well as to improve the quality of development, coordination, and enforcement of policies.

Among the different types of e-government categories, the present study focused on the G2C interactions. Citizens' willingness to adopt e-government is considered the most influential factor for the success of e-government implementation. A study by the UN Survey (2010) showed the failure of e-government in most Southern Asian countries was caused by the low adoption by citizens. Similarly, even though 72% of respondents were aware of the existence of the Pakistan's e-government web portal, most of the citizens chose face-to-face contact with

the government to make transactions (Rehman, Esichaikul, & Kamal, 2012). Izatun (2008) also reported the disappointing number of e-filing users after the e-government facility was launched two years previously in Malaysia. Ambali (2009) asserted that despite an aggressive campaign by the IRBM in promoting their e-filing service, the findings showed that the government agencies needed to make sure the services were useful, easy, and friendly as well as guaranteed the security of these services. These findings are similar to statistical reports on low usage of e-government services, and they seem to be consistent with the findings by other e-government research in developing countries (Alshawi & Alalwany, 2009; Mahbob, Nordin, Salman, Sulaiman, & Abdullah, 2011). Therefore, as the aim of the present study was to identify the main factors influencing an individual's decision making towards using e-government, this study provided important insights into the G2C interactions. In addition, the present study also limited its scope to the information and transactional levels of services while interacting with the government.

2.4 E-Government Maturity Models

There is a body of work that classifies the implementation of e-government into several stages based on the level of sophistication or functionality of the e-government service (Layne & Lee, 2001; World Bank, 2009). However, there is no definite number of stages involved due to the different approaches taken by researchers. For example, an enhanced stage is reported only by the United Nations (2005) to explain the development of governmental services, while an e-democracy stage is mentioned only by Siau and Long (2005) in their model.

The maturity models of e-government can be divided into two phases, before 2005 and after 2005 (Makoza, 2013). In the first phase, models developed only have four stages, whereas those developed in the second phase have more than four stages. The maturity models have been discussed by Gartner (2000) in his four-phase model. To measure the government's progress on e-government initiatives, the model involves a four-stage maturity model of e-government defined as follows:

1. The first stage is web presence. At this stage, the web site is static and used to provide basic information to the citizen.

2. The second stage is interaction. This stage features tools for an interaction with the stakeholders, such as search engines, documents downloading, and emails.

3. The third stage is transaction. At this stage, the user can perform online transactions completely, such for buying and selling purposes.
4. The fourth stage is transformation. At this stage, the processes are integrated and personalised.

According to Layne and Lee (2001), there are four major stages of the e-government maturity index, specifically (i) cataloguing, (ii) transaction, (iii) vertical integration, and (iv) horizontal integration. In the early stages, the governments only set up their initial website with a limited purpose (e.g., sharing the information). The second stage involves transaction activities where both citizens and government engage in electronic transactions. The third stage is characterised by integrations with different agencies in a government (i.e., federal, state, and local authorities) whereas in stage four, the integrations occur internally in government agencies.

The United Nations (2014) identified five stages of the e-government maturity index. These stages include (i) emerging, (ii) enhanced, (iii) interactive, (iv) transaction, and (v) connected. The first stage is a basic form of e-government where the government provides information on official government websites. In the second stage, the government enhance the service by providing information on policies that are related to a public-government connection. The third stage involves two-way communication where citizens communicate electronically, such as making a simple request through emails. In this stage, the government also provides downloadable forms as one of the initiatives to obtain information concerning the citizens' needs. In the fourth stage, both the citizens and the government are involved in online transactions. Income tax payment and driving licence renewals are among the examples of this stage. At the last stage, different levels of government agencies are connected and integrated through a single website or e-government portal. Another model is developed by Siau and Long (2005), which has following the e-government development stages: web presence; interaction; transaction; transformation; and e-democracy.

A recent study by Al-Nuaim (2011) highlighted five phases of e-government. The model is based on the e-government services in the Saudi Arabia. The findings highlighted the serious problems faced by the Saudi government in developing an e-government. The five stages of e-government development are defined as follows:

1. The first stage is web presence. At this stage, information is published online.

2. The second stage is one-way interaction. At this stage, each service contains offline services, such as offline forms and information services.

3. The third stage is two-way interaction. At this stage, many services are available online such as online forms. The users can download and fill out the form online and submit it to the respective authority.

4. The fourth stage is transaction. At this stage, the users can conduct secure transactions like payments and tax filling.

5. The fifth stage is integration. At this stage, the services provided by different government agencies are integrated.

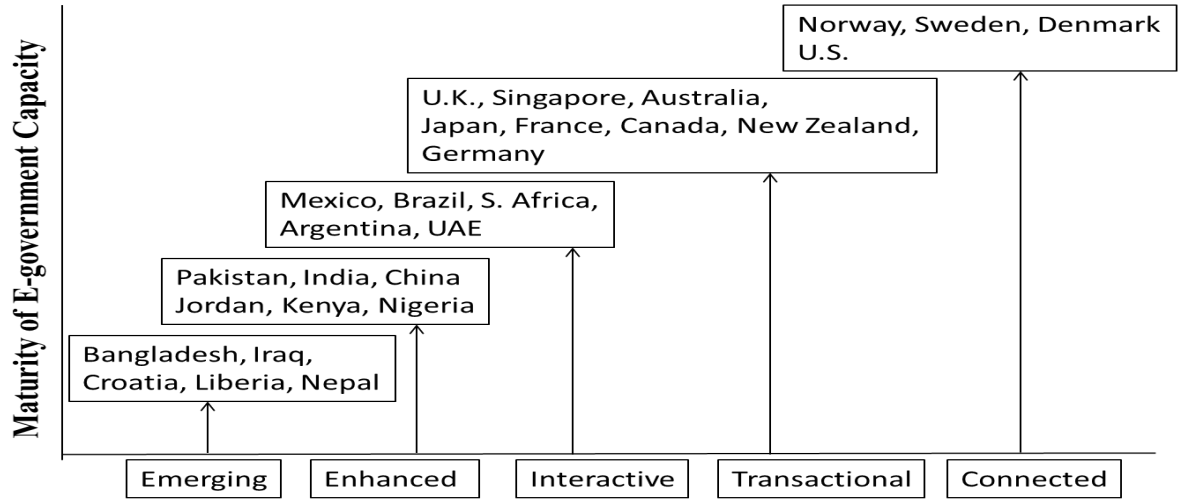
Based on the maturity models, it can be concluded that the models mainly highlight three common levels namely, presence, interaction, and transaction. Table 3 presents the grouping of the maturity stages according to their focus.

Table 2-1: Summary of models for phases in e-government implementation

Model	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Gartner's Model (2000)	Web Presence	Interaction	Transaction	Transformation	-
Layne and Lee (2001)	Catalogue Online	Transactional	Vertical Integration	Horizontal	-
The 5 Stage United Nations (2014)	Emerging	Enhanced Presence	Interactive	Transactional	Inter-governmental Network
Siau and Long (2005)	Web Presence	Interaction	Transactional	Transformation	E-Democracy
Al-Nuaim (2011)	Web Presence	One-Way Interaction	Two-Way Interaction	Transactional	Service Integration

Based on the models, in general, most of the developed countries are in transaction or connected stages, where Scandinavian countries such as Sweden and Norway are leading the way in providing their citizens with the highest level of connected services (United Nations,

2012). Similarly, in the UN E-government Readiness Ranking Index, countries from North America and Europe were higher compared to the Oceania and Africa countries (Henman, 2013).



Source: United Nations (2014)

Figure 2-1: E-government maturity model

A number of authors have studied the effects of the level of services to the technology adoption among the citizens. The surveys conducted by Rehman et al. (2012) showed that there was a significant relationship between citizens' intention to use of e-government services and the level of services. In particular, the findings showed the citizens preferred using e-information compared to using e-transaction. Awareness and information quality were significantly relevant as the main factors in influencing citizens' intention to adopt e-government services to get information from the government website, while perceived ease of use was found as a dominant factor influencing the citizens to conduct a transaction with the government. These results were in line with previous studies reported in Malaysia (Inland Revenue Board of Malaysia, 2012; Mahbob et al., 2011).

Although previous studies (e.g., Alfarraj, Drew, & Alghamdi, 2011; Mahbob et al., 2011) have discussed in detail the factors that were significantly related with the level of e-government services in developing countries, little is known about the role of the level of services in influencing the different uses of e-government services. In attempting to identify the relationships between factors influencing citizens' usage and level of e-government, Al-

Nuaim's model was selected in the research framework. The model was chosen because it was developed in a developing country, which is similar with the present study's context. The model was suitable to answer the objectives of the study. The current study also examined the Malaysians' usage of three government services namely income tax, property tax, and traffic fines. For each of these three services, both information and transaction services were examined. Two of the services, namely income tax and traffic fines, were offered by the federal government, and property tax service was offered by the local authorities.

2.5 Conceptual Models of Technology Adoption

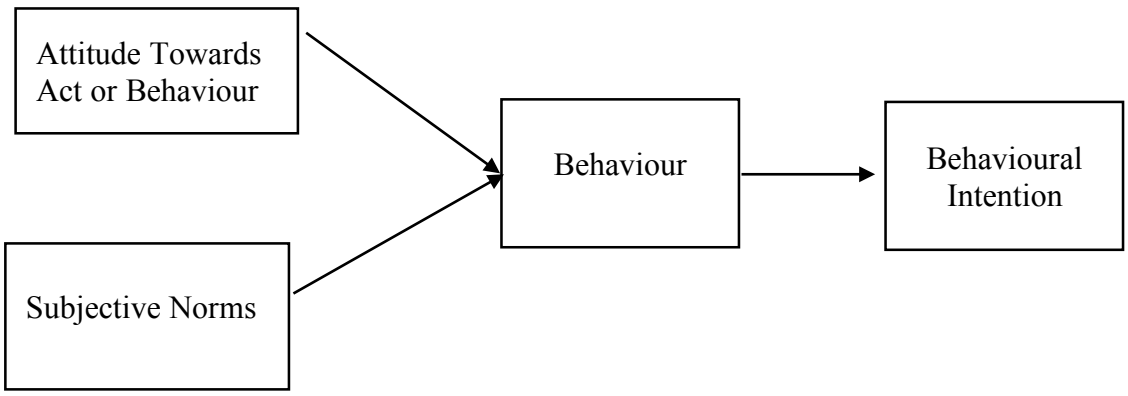
Most scholars have agreed that adoption of technology by users is a necessary condition for an effective implementation of any information technology-related project (AlAwadhi & Morris, 2009; Hossan, Habib, & Kushchu, 2006; Lallmahomed, Lallmahomed, & Lallmahomed, 2017; World Bank, 2002). Successful e-government service implementation requires the willingness of the public to adopt the services (Shareef et al., 2010). Reviews of literature have been carried out to explore the factors that influence the usage of e-government services (Alshehri, Drew, & Alghamdi, 2012a; Roushdy, 2012; Wirtz & Kurtz, 2016; Zheng, 2017). For example, several studies in middle eastern countries found that relative advantage, culture, trust of the government, ease of use, perceive usefulness, peer's review, and security issues to be factors that need to be considered regarding e-government service implementation (Al-shafi & Weerakkody, 2010; Al-sobhi, 2011; AlAwadhi & Morris, 2008; Alzahrani & Goodwin, 2012).

In seeking to understand user adoption on a technology such as e-government, there is a wide variety of models used in previous studies. All the models seek to quantitatively explain the various factors shaping user behaviour or intended use. For example, the Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975), the Theory of Planned Behaviour (TPB) (Ajzen, 1985), TAM (Davis, 1989), and UTAUT (Venkatesh et al., 2003) have been used to attempt to identify and explain the factors that affect an individual's use of IT. The following subsections explain the various models of technology adoption.

2.5.1 Theory of Reasoned Action (TRA)

This is one of the earliest models used to explain and to predict a human behaviour in the social psychology field. TRA was proposed by Fishbein and Ajzen (1975). The main assumption of this theory is that individuals are in a rational or conscious control of their behaviour and

perform actions based on the information that they have. This model explains the potential benefits of predicting an individual's intention to perform a behaviour based on attitude and normative beliefs. An empirical test indicated that TRA model was identified as performing better with a high variance explained compared to other models in terms of the significant relationship between attitude and behavioural intention (Dwivedi et al., 2017). In summary, TRA is an individual's attitude that is influenced by a combination of subjective norms and attitudes towards the performance of the behaviour to form their behavioural intention (Fishbein & Ajzen, 1975). The theory can be explained by a model, as shown in Figure 2-2. The major variables of TRA are attitude towards a behaviour (the degree to which personal belief of the behaviour is positively or negatively valued), subjective norms (peer influence or the social environment on behaviour), and behavioural intention as an outcome variable. In general, this model is stated as "a predictive model for behaviour attitude and behavioural intention" (Dajani & Yaseen, 2016: 3) and "one of the most fundamental and influential theories of human behaviour" (Venkatesh, Morris, Davis, & Davis, 2003: 428).



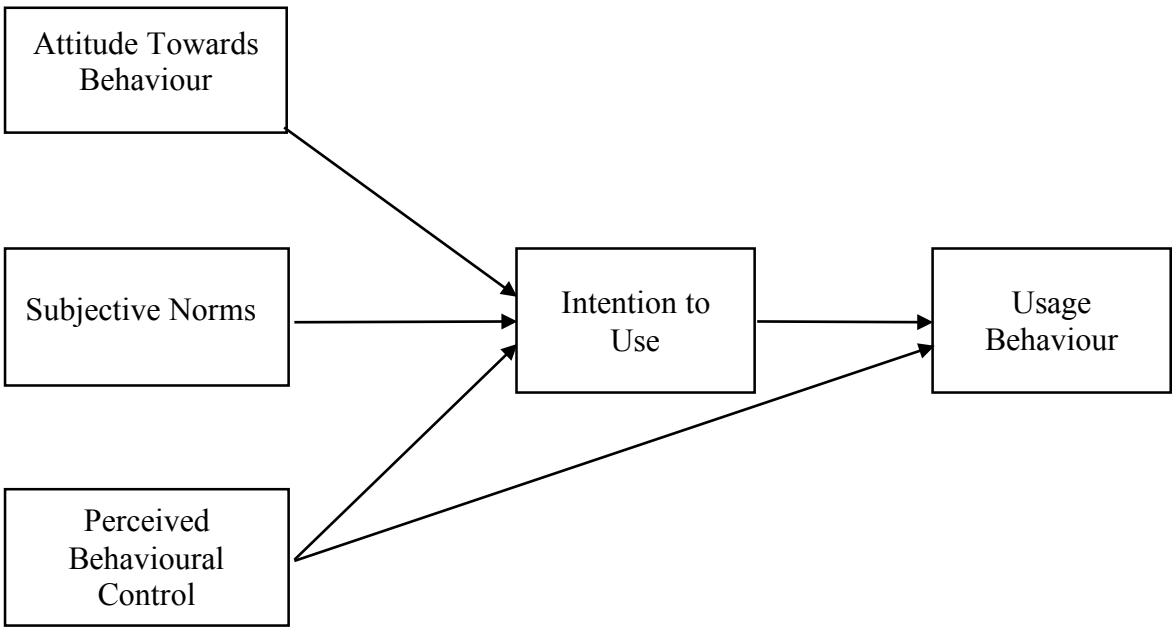
Source: Fishbein and Ajzen (1975)

Figure 2-2: Theory of Reasoned Action

Even though the TRA model has been widely cited in the previous studies, several limitations have been identified. As stated by Sheppard et al. (1988), in order to predict a specific behaviour, attitude, and intention, citizens have to agree on the action. Thus, irrational decisions or attitudes, or any behaviours that are not consciously considered, cannot be explained by this theory. Thus, Ajzen (1985) proposed the Theory of Planned Behaviour (TPB) to counter the issue of irrational behaviours emerging from the TRA model.

2.5.2 Theory of Planned Behaviour (TPB)

TPB is an extension of TRA that explains and predicts a variety of intentions and behaviours. Ajzen (1991) empirically demonstrated TPB was more applicable than TRA, with a clear theoretical framework to understand and predict an individual's behaviour particularly in technology adoption. In fact, the TPB differs from the TRA by introducing the perceived behavioural control (PBC) component (Ajzen, 1991). PBC is held to influence both intention and behaviour that will influence the behaviour directly or interactively. The TPB suggests that behaviour can be explained by behavioural intention, which is influenced by attitude, subjective norms, and perceived behavioural control (Ajzen, 1991). The studies based on the TPB model have been widely employed in various contexts such as user's behaviour towards e-services (Lu et al., 2010), continual behaviour towards smart parking (Kianpisheh, Mustaffa, Mei Yean See, & Keikhosrokiani, 2011) and electronic commerce (Yaghoubi et al., 2010). Moreover, a meta-analysis study that investigated the applicability of the model to the e-government research indicated that the TPB model was more established compared to other IS acceptance theories (Rana, Dwivedi, & Williams, 2013). The difference as TPB focuses on perceived behavioural control that influences both intention and behaviour (see Figure 2-4). Perceived behavioural control (PCB) is an individual's perception as to whether they believe they can perform a particular behaviour or not (Ajzen, 1991). For example, in the context of e-government services, PCB is defined as whether or not an individual believes they could use the e-government service to successfully participate and engage in an interaction with the government.



Source: Ajzen (1991)

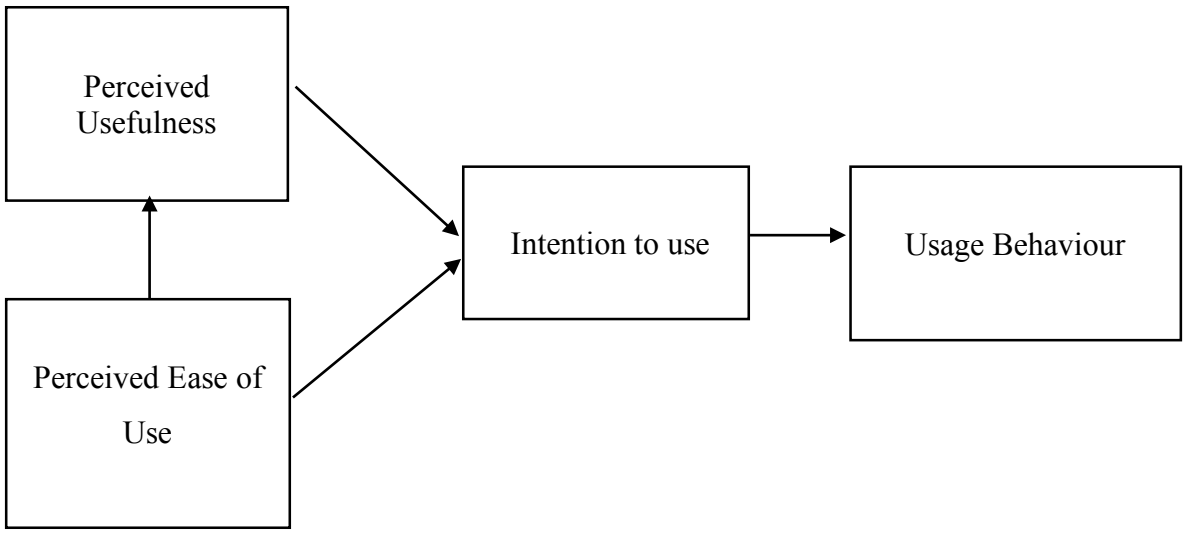
Figure 2-3: Theory of Planned Behaviour

Ajzen (1991) asserted that PCB was purposely introduced into TPB to compensate for the volitional control limitation of TRA. However, Taylor and Todd (1995) criticised the model, stating that it is assumed that for an individual to successfully perform some behaviour, they are required to have opportunities, motivation, and resources. Furthermore, the introduction of PCB as an answer to all non-controllable elements of behaviour such as fear, anxiety, threat, or past experience is not well explained by actual control (Ajzen, 2006). Due to the complexity of e-government and the diversity of the adopters (Eagly & Chaiken, 2002), TPB should account for other factors that will influence behavioural intention (Yaghoubi et al., 2010).

2.5.3 Technology Acceptance Model (TAM)

TAM model is the most utilised model in the IS literature (Carter & Weerakkody, 2008; Ozkan & Kanat, 2011; Warkentin et al., 2002). Davis (1989) introduced TAM as an extension to the TRA model to explain the determinants that will influence an individual's acceptance towards a technology. TAM is similar to TRA, except for attitude, which is not included (Oye, Lahad, & Ab. Rahim, 2012). TAM replaces TRA constructs with two technology acceptance measures namely PU and PEOU. In the domain of Information Systems Research, TAM is the most widely used model, followed by TRA and TPB (Lai, Lai, & Jordan, 2009). TAM posits that

PU is influenced by PEOU; the easier is a technology is perceived to use, the more useful it. Figure 2-3 demonstrates the TAM model.



Source: Davis (1989)

Figure 2-4: Technology Acceptance Model

In general, PU refers to the degree to which an individual believes that technology would improve his or her job performance, and PEOU indicates the degree to which an individual believes that using technology would be free from effort (Davis, 1989; Gefen, Karahanna, & Straub, 2003). Researchers have employed the TAM model in various ways in e-government research (Gefen et al., 2003; Lu et al., 2010; Moon & Kim, 2001; Warkentin et al., 2002). For example, Phang, Li, Sutanto, and Kankanhalli (2005) conducted a study that involved senior Chinese citizens as the respondents. They proposed the TAM model as the fundamental theory for the study. The findings showed PEOU and Internet security had a huge influence on technology adoption among the senior citizens in China.

In the last two decades, TAM has reached a remarkable accomplishment and is widely cited with more than 1,000 citations (Venkatesh, Thong, Chan, Hu, & Brown, 2011). Bagozzi (2007) stated that the model is "reaching the status of paradigm." However, the TAM model has been reported as having several limitations. First, TAM has been criticised for its low and limited predictive power (Younghwa Lee, Kozar, & Larsen, 2003). Low variance explanations have been cited as a major problem in TAM studies. Gefen, Karahanna, and Straub (2003) reported its predictive power to be only 25%, while Venkatesh et al. (2003) reported 30–40%. As a

consequence, the low explanatory power of TAM contributes to the low descriptive richness and leads researchers to draw simple conclusions (Plouffe, Julland, & Vandenbosch, 2001). Although the TAM model shows comprehensiveness in explains the relationship between constructs and user behaviour, the low explanatory power inherent in the model has led to inconsistent results.

The second shortcoming of TAM is the inconsistent relationship among the variables. Sun and Zhang (2006) claimed the inconsistent results had made researchers question the generalisability of this model across different contexts. Furthermore, Sun and Zhang (2006) agreed moderating factors may be introduced to explain this inconsistency. Previous studies also urge the inclusion of some moderating factors such as gender, education, job, experience, age and voluntariness of use (Akram & Malik, 2012; Venkatesh et al., 2003). Srite (2006) indicates there are external variables that influence technology adoption, variables which are missing in TAM and lead to inconclusive results.

The third shortcoming of TAM model is related to the type of respondent. Some studies used university students as their respondents (Gefen et al., 2003; Lee, Kozar, & Larsen, 2003), and the use of this type of respondents will deteriorate the generalisability of the findings. Furthermore, using students as subjects is inappropriate to reflect the real working environment (Lee et al., 2003). Thus, this present study targeted the actual users as the respondents to help improve the generalisability of the findings.

Finally, even though the behavioural usage is stated as among the predictors, most of previous studies that used TAM model were merely focused on or measured a behavioural intention. Therefore, the accuracy of the TAM model in predicting the citizens' actual usage behavioural on technology adoption is questioned (Dajani & Yaseen, 2016).

2.5.4 Diffusion of Innovations (DOI)

Another popular model on technology adoption is Diffusion of Innovation (DOI) developed by Rogers (1995). This theory seeks to explain adoption of an innovation over time. DOI classifies five groups of adopters namely innovators, early adopters, early majority, late majority, and laggards (Rogers, 1995). A considerable number of IS research on technology adoption works were performed using this model (Hussein, Mohamed, Rahman Ahlan, & Mahmud, 2011; Lean et al., 2009; Rana et al., 2013). Most of these studies agreed that if the citizens perceived

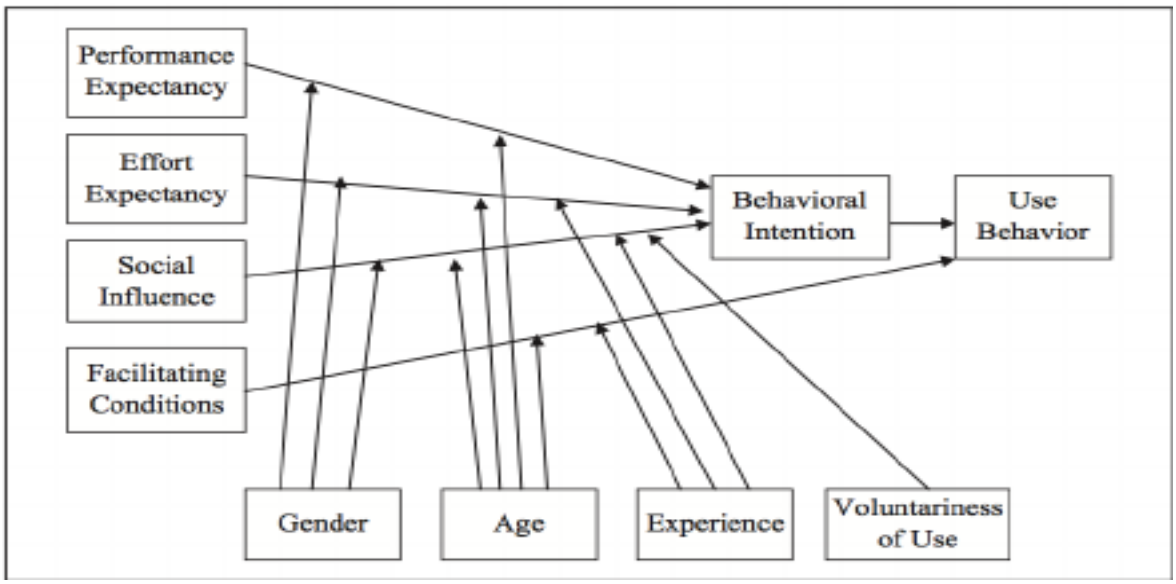
that the technology was consistent on its benefit, they would be more certain about the expected benefits of the technology (Lean et al., 2009). DOI consists of four factors that have positive impacts to the technology adoption, namely Relative Advantage (the degree to which an innovation is perceived as better than the idea it supersedes), Compatibility (the degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopter), Trialability (the degree to which an idea can be experimented with on a limited basis), and Observability (the degree to which the results of an innovation are visible). There is also one negative impact on the adoption of innovations namely Complexity (the degree to which an innovation is seen by the potential adopter as being relatively difficult to use and understand) (Rogers, 1995).

Like other models, DOI has been widely used and integrated into other models to investigate the factors that influence the citizens' adoption in technology (Carter & Bélanger, 2005; Lean et al., 2009). Lean et al. (2009) integrated the TAM and DOI models as a framework to investigate the factors leading to the citizens' intention to use technology. They included only Relative Advantage and Complexity in their research model as both constructs were significantly associated with behavioural intention towards e-government use. The Complexity construct in the DOI model is often considered to be like that of PEOU in the TAM model (Holden & Karsh, 2010) and effort expectancy in the UTAUT model (Venkatesh et al., 2003). Therefore, based on this argument, they included only Relative Advantage and compatibility in their research model. Sang, Lee, and Lee (2010) also claimed Complexity in DOI and PEOU in TAM were similar, thus their study only included Relative Advantage and Compatibility, while DOI theory was taken as their fundamental theory.

2.5.5 Unified Theory of Acceptance and Use of Technology (UTAUT)

Venkatesh et al. (2003) created the UTAUT model to present a more complete picture of the acceptance towards technology compared to the previous models. UTAUT emerges from eight previous models, which have been discussed frequently in the Information Systems Research literature. Several authors have asserted that the UTAUT model is suitable, valid, and reliable in understanding on user adoption on e-government (Kurfali, Arifoğlu, Tokdemir, & Paçin, 2017; Taiwo, Mahmood, & Downe, 2012). Although most of the previous studies used and integrated the TAM, TRA, and TPB models to explain technology acceptance among people, none of these models is better than the UTAUT model in terms of explanatory power. In

particular, the UTAUT model, as explained by Venkatesh et al. (2003), has an explanatory power of almost 70% to predict the technology adoption.



Source: Venkatesh et al. (2003)

Figure 2-5: Unified Theory of Acceptance and Use of Technology

As shown in Figure 2-5, the UTAUT model contains four key constructs: Performance Expectancy (the degree to which a user believes that using the e-government service will help them attain gains in job performance); Effort Expectancy (the degree of how ease a user perceives the e-government services); Social Influence (the degree to which a person perceives their important others believe they should use e-government services); and Facilitating Conditions (the degree to which organisational or technical infrastructures exist to support the use of the e-government services). These are held to effect to the behavioural intention that leads to the actual use behaviour (Venkatesh et al., 2003). These predictors contain a number of similarities with other theories, as shown in Table 2-2 where similar ideas are on each row.

Even though this model has a high explanatory power, it also has several shortcomings in terms of missing factors. According to Bagozzi (2007), the UTAUT model is a well-established theory to explain the acceptance of technology, but the model has also left out several important independent variables such as perceived trust on technology, perceived risk, and quality. An empirical review of the literature has found that the citizens' decision to use or not to use e-government services is influenced by several factors that are excluded in the UTAUT model

(AlAwadhi & Morris, 2008; Rana, Dwivedi, & Williams, 2015; Rana, Williams, Dwivedi, & Williams, 2012).

Table 2-2: Definition and root construct of the UTAUT model

TRA (Fishbein & Ajzen, 1975)	TAM (Davis, 1989)	TPB (Ajzen, 1991)	DOI (Rogers, 1995)	UTAUT (Venkatesh et al., 2003)
	Perceived Usefulness: The degree to which using a specific application will increase a user's job performance within an organisational context (Davis, 1995: 985)		Relative Advantage: The degree to which an innovation is perceived as better than the idea it supersedes (Rogers, 1995: 15)	Performance Expectancy: The degree to which an individual believes that using the system will help user to attain gains in job performance (Venkatesh et al., 2003: 447)
	Perceived Ease of Use: The degree to which the user expects the target system to be free of effort (Davis, 1995: 985)		Complexity: The degree to which an innovation is perceived as difficult to understand and use (Rogers, 1995: 16)	Effort Expectancy: The degree of ease associated with the use of the system (Venkatesh et al., 2003: 450)
Attitude: An individual's positive or negative feelings of performing the target behaviour (Fishbein & Ajzen, 197: 216)	Attitude: Same like TRA and TPB in the original TAM, but later dropped.	Attitude: Same like TRA	Trialability: The degree to which an innovation may be experimented with on a limited basis (Rogers, 1995: 16	

Subjective Norm: The person's perception that most people who are important to him think he or she should or should not perform the behaviour in question (Fishbein & Ajzen, 197: 216)		Subjective Norm: Same like TRA	Observability: The degree to which the results of an innovation are visible to others (Rogers, 1995: 16)	Social Influence: The degree to which an individual perceives that important others believe he or she should use the system (Venkatesh et al., 2003: 451)
		Perceived Behavioural Control: Reflects beliefs regarding access to the resources and opportunities to perform a behaviour that may impede performance of the behaviour (Ajzen, 1991: 34)	Compatibility: An innovation is perceived as being consistent with the values, past experiences, and needs of potential adopters (Rogers, 1995: 16)	Facilitating Conditions: The degree to which an individual believes that an organisational and technical infrastructure exists to support the use of the system (Venkatesh et al., 2003: 453)
Behavioural Intention: The strength of an individual's intention	Behavioural Intention to Use: Same like Behavioural Intention in TRA and TPB	Behavioural Intention: Same like TRA		

to perform a specified behaviour.				
				Use Behaviour: Measures users' actual frequencies of technology use.

Source: Adopted from Srite (2006)

2.6 Variables in Models of Use

In general, every model comprises several predictors to explain the outcome variables. Some models explain the relationship between predictors and outcome variables with mediator and moderator variables. For example, TAM highlights the role of intention to use as a mediator to influence the relationship between predictors and outcome, which is actual use. Table 2-3 summarises the predictors, outcomes, mediators, and moderators of selected technology adoption models.

Table 2-3: List of constructs in the technology adoption model

Model	Predictors	Moderators	Mediators	Outcomes
TRA	Attitude, Subjective Norm	-	-	Behavioural Intention
TAM	Perceived Usefulness, Perceived Ease of Use, Attitude	-	Intention to Use	Use Behaviour
TPB	Attitude, Subjective Norm, Perceived Behavioural Control	-	-	Behavioural Intention
DOI	Relative Advantage, Compatibility, Complexity, Trialibility, Observability	-	-	Behavioural Intention
UTAUT	Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Conditions	Gender, Age, Experience, Voluntariness	Behavioural Intention	Use Behaviour

Besides the higher explanatory power compared to other models, the decision to use the UTAUT as the base model was based on the claim by AlAwadhi and Morris (2009) that the UTAUT model provides a more complete picture of the acceptance and use of technology than any models, particularly in the developing country (Kurfal, Arifoğlu, Tokdemir, & Paçin, 2017). Based on the explanation on technology adoption models in Section 2.5, this study used three constructs (Performance Expectancy, Effort Expectancy, and Social Influence) in the UTAUT model to examine the relationship between predictors and actual use behaviour on e-government services. As the study examined the factors influencing the citizens' use behaviour on technology (G2C), Facilitating Conditions were dropped as the variable was only suitable in an organisational setting that deals with the technical and software assistance (Yahya et al., 2011). In addition, the moderator namely voluntariness of use was also dropped as this study only focused on registered users of income tax online service (e-filing) who had used any e-government services in the past two years. This approach was in line with previous studies where the authors claimed that e-government services were offered in voluntary (AlAwadhi & Morris, 2009) and as a registered users for particular e-services (e.g. e-filing), the voluntariness of use is not significant (Al-Gahtani, Hubona, & Wang, 2007). However, as this present study also investigated the user's behaviour on local authority property tax services (e-assessment and e-payment), the type of local authority was added.

2.7 E-government Research Applying the UTAUT Model

A number of studies have investigated the adoption of e-government services using the UTAUT model. This model has been cited in wide areas of studies such as tax payment, e-learning, and mobile technology, focusing on variety of user groups (for instance students, general users, and government servants). The academic journal database Thomson Scientific Web of Science showed a total of 870 citations to the UTAUT model. In addition, the model was cited almost 5,000 times since it was introduced in 2003 (Williams, Nripendra, & Dwivedi, 2015).

In seeking to understand the factors affecting the adoption of e-government by citizens, a review of extant literature indicated several critical factors (Table 2-4). For example, a survey was conducted on 249 students in Kuwait to examine the factors influencing citizens' adoption on e-government services (AlAwadhi & Morris, 2009). The findings showed that Performance Expectancy, Social Influence, and effortlessness of the e-services were significantly correlated with an increase of usage. Similar results were also found when the UTAUT model was taken

as a fundamental framework to investigate the factors driving citizens to use e-government services in Iraq (Faaeq, Alqasa, & Al-Matari, 2015).

The adoption of e-government services among the citizens in the UAE (AL-Athmay, Fantazy, & Kumar, 2016) focused on the role of the quality of the website in influencing the adoption of e-government portal. The findings revealed that all the UTAUT constructs except the Social Influence had a significant effect towards the citizens' usage. In addition, the study also found when the quality of the government portal website was high, usage numbers increased.

Lallmahomed, Lallmahomed, and Lallmahomed (2017) investigated the factors leading to the use of eGov service in Mauritius. The cross-sectional survey involving 247 citizens showed that Performance Expectancy and Perceived Value were positively related to Behavioural Intention. In addition, trust and computer self-efficacy had a significant relationship with the Behavioural Intention towards using e-government services.

Although UTAUT has been cited by a large of number of studies, a meta-analysis study by Williams et al. (2011) found that research that used UTAUT model were driven by many external variables. The finding showed out of 43, only 16 studies that used the UTAUT model as a guiding theory fully utilised the original constructs. As mentioned by Venkatesh, Morris, Davis, and Davis (2003: 471), "it is possible that we may be approaching the practical limits of our ability to explain individual acceptance and usage decisions in organizations." Hence, many scholars have integrated or modified the original UTAUT model with other acceptance models or constructs. According to Alzahrani and Goodwin (2012) and Rahman, Jamaludin, and Mahmud (2011), an integrated model is necessary to suit the particular context of the study. Alzahrani and Goodwin (2012) did some modification and revision on the UTAUT model to suit with the local culture to gain a better understanding of e-government acceptance in Saudi Arabia. They suggested that trust and privacy should be included as additional factors in the UTAUT model particularly to explain the factors influencing technology adoption in developing countries. In addition, the authors also claimed that the original constructs developed from the UTAUT model may not suit all circumstances, and this shortcoming will lead to further research. Furthermore, from the critical review on previous research that applied the UTAUT model and discussed the capabilities of the UTAUT model in developing countries (Dwivedi et al., 2017; Faaeq et al., 2015; Lean et al., 2009; Rana & Dwivedi, 2015; Rana et al., 2013), the researcher believed that the UTAUT model would be the best base model to be adopted for this study in order to explore and investigate the UTAUT constructs and additional

factors affecting the acceptance of e-government services in a developing country such as Malaysia.

The relationships among Trust in the Internet, Trust in the Government, and Perceived Security have also been examined in previous studies. Some studies (e.g., Hung, Chang, & Yu, 2006; Kumar et al., 2007) integrated Trust and Security Concerns with other technology acceptance theories to explain the factors influencing an individual's usage of e-government services. Failure to reassure the citizens' privacy and security in government portals, information, and other aspects of e-government will not result in the full use of electronic services (Carter & Belanger, 2008). Lack of confidence in the government's capability to implement e-government services may cause a lack of support from the citizens (Maniam & Halimah, 2010; Sin, 2009).

Previous Information Systems Research has identified that service quality can be a key term for determining the success of electronic services (e.g., Petter, DeLone, & McLean, 2008; Zeithaml, Berry, & Parasuraman, 1996). Thus, it is important to examine the quality of e-services in order to increase people's adoption of e-government services. Several studies have shown that interactive government websites promote openness and lead to better service delivery and citizen participation with government. The studies also show the quality of the government website was significantly related to user satisfaction, and therefore will determine whether users would continuously use the website. As stated by Rotchanakitumnuai (2008), the dimensions of the quality of e-services are different from that of traditional services in which the user interface and web designs are absent in the traditional services. Table 2-4 presents the lists of the variables that have modified UTAUT original construct and use of other constructs in additional the UTAUT.

Table 2-4: Summary of variables used in the UTAUT research

Determinants	**The Sub determinants**	**Authors**
UTAUT Constructs		
Performance Expectancy	Perceived Usefulness/ Job-Fit/ Relative Advantage	(AlAwadhi & Morris, 2008; M. E. Alzahrani & Goodwin, 2012; Bhatiasevi, 2015; Chiemeke & Evwiekpaefe, 2011; Lallmahomed et al., 2017; Orji, Cetin, & Ozkan, 2010; Williams et al., 2015)

Effort Expectancy	Perceived Ease of Use/ Complexity	(Bhatiasevi, 2015; Israel & Tiwari, 2011; Kurfali et al., 2017; Bhatiasevi, 2015; Chiemeke & Evwiekpaefe, 2011; Lallmahomed et al., 2017; Orji, Cetin, & Ozkan, 2010; Williams et al., 2015)
Facilitating Conditions	Perceived Behavioural Controls/ Facilitating Conditions/ Compatibility	(Alzahrani & Goodwin, 2012; Mahbob et al., 2011; Mohd Suki & Mohd Suki, 2017; Mohd Suki & Ramayah, 2010)
Social Influence	Subjective norms/ Social factors/ Image	(Al-shafi & Weerakkody, 2010; AlAwadhi & Morris, 2009; Hassan & Palil, 2012; Lean et al., 2009; Taiwo et al., 2012)
External constructs		
Self-efficacy	Awareness	(Al-shafi & Weerakkody, 2010; Ambali, 2009; Teck Hong & Yin-Fah, 2012)
	Perception on benefits	(AlAwadhi & Morris, 2008; Mahbob et al., 2011; Ramayah, Ramoo, & Ibrahim, 2008)
	Motivation	(Thompson, Vivien, & Raye, 1999)
Trustworthiness	Trust in government	(Alsaghier et al., 2009; Khattab, Al-Shalabi, Al-Rawad, Al-Khattab, & Hamad, 2015; Kurfali et al., 2017)
	Trust in internet	(Al-sobhi, Weerakkody, & El-Haddadeh, 2011; Alzahrani & Goodwin, 2012)
Perceived Quality	Quality of service	(Bhatnagar, 2009; Irani et al., 2012; Sousa & Voss, 2012)
	Quality of website	(Alzahrani & Goodwin, 2012; Hong & Fah, 2012)
Perceived Risk and Security		(Al-shafi & Weerakkody, 2010; Ambali, 2009; Hassan & Palil, 2012; Horst et al., 2007; Israel & Tiwari, 2011; Lean et al., 2009; Taiwo et al., 2012)
Demographic	Experience and skill	

		(AlAwadhi & Morris, 2008; Deursen, Dijk, & Ebbers, 2006; Teck Hong & Yin-Fah, 2012)
	Intermediatery (culture)	(Al-Hujran, Al-Dalahmeh, & Aloudat, 2011; Al-sobhi et al., 2011)
	Multichannel systems	(Mahbob et al., 2011; Sousa & Voss, 2012)

2.8 Previous E-government Studies in Malaysia

This section reviews previous studies that focused on citizens' adoption on technology in Malaysia. Besides conducting a literature search from the IS publication databases Thomson, EBSCOHOST, and Elsevier, to name a few, Google Scholar and Academia.edu were also used to ensure no articles were not left out. From the search, 33 articles on the topic of technology adoption among Malaysian citizens were identified. Out of 33 articles, only 17 articles were selected for literature analysis as these articles focused on the G2C context. Table 2-5 lists down the articles reviewed in the literature analysis.

The previous studies used various adoption models. However, as shown in Table 2-5, most of the studies developed and tested their conceptual framework based on the TAM model. Moreover, most of these studies used the original constructs proposed in the TAM model (e.g., Perceived Usefulness and Perceived Ease of Use was consistently significant and strongly positively associated with citizens' use of technology). Furthermore, the analysis demonstrates that previous studies examined technology adoption using Behavioural Intention or Intention to Use as the outcome variable not actual use. For instance, even though prior works used several models such as DOI (J. Kaur & Rashid, 2008), TAM (Hussein, Mohamed, Ahlan, & Mahmud, 2011; Lean et al., 2009), and TRI (Dorasamy et al., 2010), the outcome variable of these studies was Behavioural Intention on technology adoption.

Table 2-5: Summary of articles related to the technology adoption in Malaysia

Authors	Underpinning theory	Determinant constructs	Outcome constructs	Findings
Pitchay Muthu Chelliah, Thurasamy, Alzahrani, Alfarraj, and Alalwan (2016)	DOI	Relative advantage, ease of use, compatibility, visibility, image result demonstrability	Intention to use e-licensing	Ease and use and visibility, relative advantage and visibility/observability have significant relationship with employees' intention to use e-licensing
Che Azmi and Bee (2010)	TAM	Perceived usefulness, perceived ease of use, perceived risk	Behavioural intention	Perceived usefulness, perceived ease of use and perceived risk to influence e-filing use.
Dorasamy, Marimuthu, Raman, and Kaliannan, (2010)	TAM, DOI and Technology Readiness Index	Perceived usefulness, perceived ease of use, perceived readiness, complexity	Behavioural intention	Perceived usefulness, perceived readiness, complexity significantly associated with e-filing use.
Eze, Goh, Ling, and Lee (2011)	TAM	Perceived usefulness, perceived ease of use, security, internet infrastructure, reliability, convenience	Intention to use	Security, internet infrastructure, reliability, convenience have significant relationship with intention to use e-government services
Hong and Fah (2012)	TAM, UTAUT	Effort expectancy, performance expectancy, perceived risk, personal innovativeness, web self-efficacy, social influences	Intention to use	Effort expectancy, performance expectancy, social influence and web self-efficacy were statistically significant determinants of e-filing adoption.

Hussein, Karim, and Selamat (2007)	Delone and McLean	Systems quality, information quality, perceived usefulness, user satisfaction	IS success dimensions system	All the technological factors are significantly correlated.
Mohd Idris, Kasimin, and Sahari (2011)	TAM, TRA	Ease of use, secure, reliable, enjoyable, infrastructure	E-government use	Ease to use, enjoyable, secure, reliable are related to e-government use.
Hussein, Mohamed, Ahlan, and Mahmud, (2011)	TAM, DOI, Perceived Characteristics of Innovating (PCI)	Perceived ease of use, perceived usefulness compatibility, image, result demonstrability, social influence, service quality, perceived risk, trust in the government, trust in the internet, internal political self-efficacy, external political self-efficacy	Intention to use	Perceived ease of use, perceived usefulness, compatibility, image, result service quality, perceived risk, trust in the government are found to be associated on e-filing use
Kaur and Rashid (2008)	DOI	Complexity, security concern, privacy concern, it illiteracy	E-services adoption	Complexity, security concern, privacy concern, it illiteracy are negatively associated with e-services adoption.

Lean, Suhaiza, Ramayah, and Fernando (2009)	TAM, DOI	Trust, perceived usefulness, perceived relative advantage, perceived image, perceived strength of online privacy, perceived strength of non-repudiation, uncertainty avoidance	Intention to use	Trust, perceived usefulness, perceived relative advantage and perceived image, respectively, has a direct positive significant relationship towards intention to use e-government service
Moorthy, Samsuri, Hussin, Othman, and Chelliah (2014)	TAM, TPB	Perceived use of use, perceived usefulness, perceived security, perceived credibility, perceived service, information quality	E-filing behaviour	Perceived use of use, perceived usefulness, perceived security, and perceived credibility influence e-filing use
Mahbob et al., (2011)	TPB	Attitude, subjective norms, behavioural control	Usage behaviour	Attitude, behavioural control direct effect on e-government use.
Mohd Suki and Ramayah, (2010)	TAM, DOI	Usefulness, ease of use, attitude, compatibility, social influences, computer self-efficacy, facilitating conditions, subjective norm, perceived behavioural control	Intention to use	Perceived usefulness, ease of use, compatibility, interpersonal influence, external influence, self-efficacy, facilitating conditions, attitude, subjective norms, perceived behavioural control, and intention to use e-government services/system

Taiwo, Mahmood, and Downe (2012)	UTAUT	Performance expectation. peer influence, trust belief, risk	Behavioural intention	Performance expectation, peer influence, trust belief and risk taken propensity are significant in predicting behavioural intention to adopt e? government.
Yahya, Nadzar, and Abd Rahman (2011)	UTAUT	Performance expectancy, effort expectancy, social influence, information quality, system quality	Intention to use	Performance expectancy, effort expectancy, social influence, and information quality have positive relationship on using e-Syariah
Kianpisheh, Mustaffa, Mei Yean See, and Keikhosrokiani (2011)	UTAUT	Performance expectancy, subjective norm, perceived usefulness, perceived ease of use	Behavioural intention	Performance expectancy, subjective norm, perceived usefulness, perceived ease of use significantly associated with smart parking system

2.9 Limitations in Previous Studies

From the literature review above, several limitations can be identified. First, a large portion of previous studies in e-government were conducted and tested for a single service (Bhuasiri, Zo, Lee, & Ciganek, 2016; Che Azmi & Bee, 2010; Kumar, Mukerji, Butt, & Persaud, 2007; Lallmahomed, Lallmahomed, & Lallmahomed, 2017; Mohd Suki & Mohd Suki, 2017; Moorthy, Samsuri, Hussin, Othman, & Chelliah, 2014; Pitchay, Ramayah, Alzahrani, Alfarraj, & Alalwan, 2016; Rufín, Medina, & Figueroa, 2012). Thus, by using six different e-services, the present study will investigate the applicability of constructs to the different e-services in one study for the same population group simultaneously.

Second, most of the studies investigated Intention to Use as an outcome variable to identify success factors on technology adoption. Even though the UTAUT model proposes Behavioural Use as a dependent variable, the number of studies that used this construct is low (Al-Qeisi, 2009; Bhatiasevi, 2016; Mei-Ying, Pei-Yuan, & Yung-Chien, 2012; Williams et al., 2011; Yahya, Nadzar, & Abd Rahman, 2011), and a meta-analysis study has shown that only 13 studies had partially or fully used all the constructs in the UTAUT model as a guiding framework (Rana et al., 2013). Intention to use is not the same thing as actual use. A focus on the latter provides a better understanding of drivers of e-services use.

Finally, a considerable volume of previous studies in Malaysia (see Table 2-5) focused on IS success by using the TAM model, while the number of studies that used the UTAUT model was limited. Thus, as the UTAUT model was claimed to have a higher accuracy to predict the adoption compared to other models, this study tested the e-government adoption among the Malaysian citizens.

2.10 Conceptual Framework

This study investigated the factors associated with citizens' use of different e-government services. For that purpose, a range of factors that may explain the citizens' use or non-use of specific e-government services were identified from the literature. Many studies have integrated several models to understand citizens' use of technology. The empirical studies by Chang et al. (2005) in Taiwan and Phang et al. (2005) in Singapore revealed trust was a major factor that influenced a person's intention to use e-government services. Yet, when using UTAUT as the fundamental theory, these studies indicated security and privacy indirectly

influenced a person's trust in the Internet in the two developed countries. In Malaysia, a study by Lean et al. (2009) proposed a model that was generated from several models to understand the intention of people to use e-government services. Besides Perceived Usefulness, Relative Advantage, and image, the findings also showed that trust has a significant relationship with adoption of e-government services among the users. Besides trust, the initial conceptual framework also included quality of website and security as these factors were identified as the major factors that influenced technology adoption particularly in developing countries (Eze et al., 2011; Kaur & Rashid, 2008; Nugroho, 2015). Figure 2-6 displays the initial conceptual framework that incorporates the factors derived from the UTAUT model, as well as trust in the government and the trust in the Internet, security concerns, and quality of the website that may be expected to be associated with citizens' use of e-government services. As the study involved six services, the model was also repeated six times to represent the service accordingly.

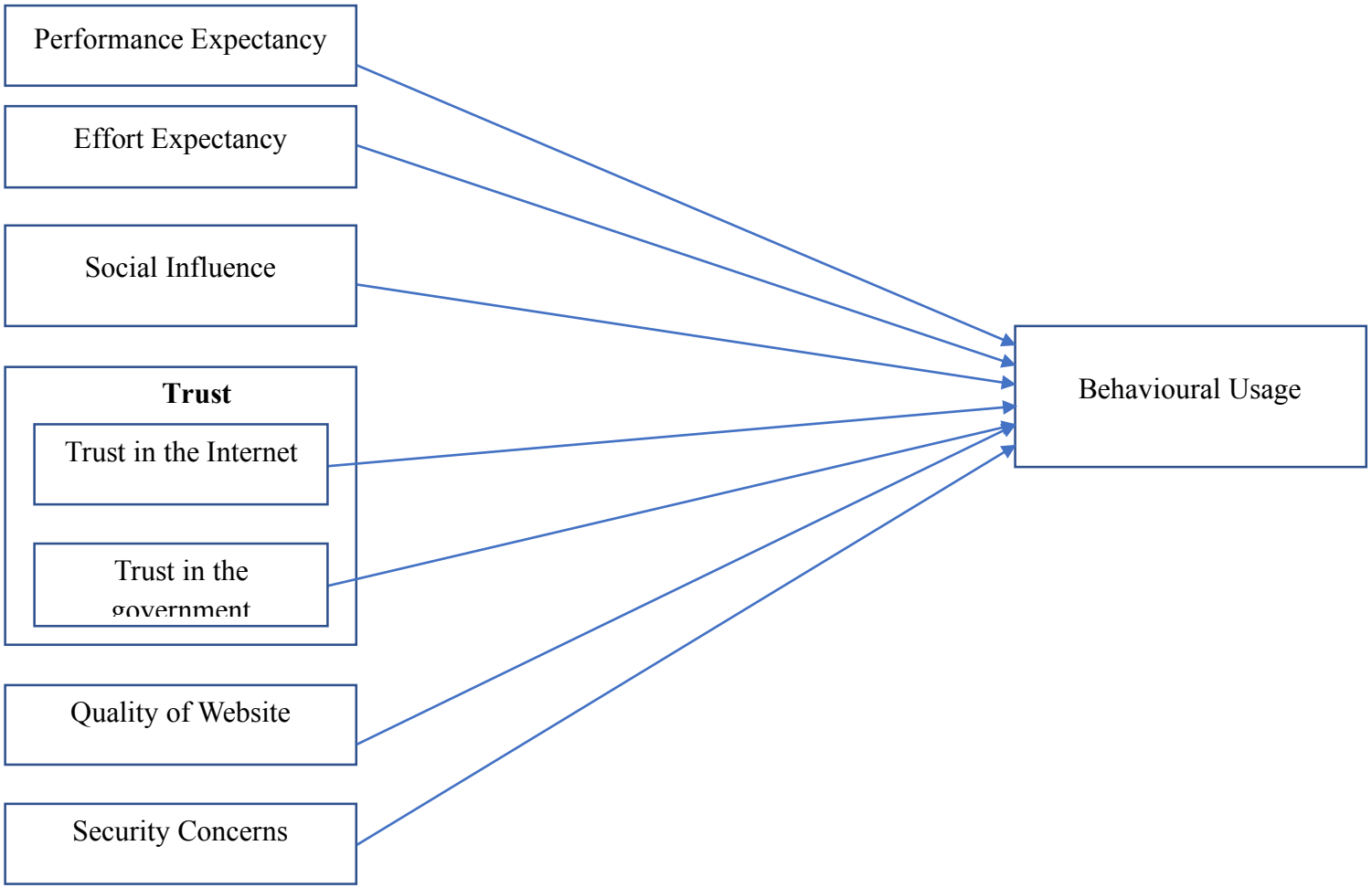


Figure 2-6: Initial research model for each of e-services

2.11 Chapter Summary

This chapter has presented an overall background on the concept, context, and maturity level of e-government. In addition, as discussed in Section 2.10, the Malaysian government are actively and progressively adopting several new technologies that will possibly enhance the G2C relationship. This chapter has also addressed some models and theories that are related to the technology adoption, as well as the previous studies implemented in Malaysia. Finally, from this literature review, three gaps have been identified. First, it is clear that most of the previous studies were developed with a single e-service. Second, most of the previous studies that used by the UTAUT model used Intention to Use as a dependant variable, instead of Behavioural Usage. Third, the number of studies that used the UTAUT model in Malaysia is still limited.

Chapter 3 : Methodology

3.1 Introduction

Creswell (2003) points out the important questions that researchers should ask when choosing the appropriate methodology for their research. Researchers need to understand the reasons they should choose one approach over the other in designing a study, as different epistemologies have different methodologies (Creswell, 2003: pp. 3). The purpose of this chapter is to explain the methodology used in this study. The first section explains the research site, followed by a discussion on the research process in Section 3.3. Section 3.4 describes the justification of the selection method. The data collection sources are explained in Section 3.5. This section also explains in detail the first stage of study in which the general drivers of technology adoption was confirmed from interviews, and after which a revision of the conceptual model was proposed. This stage was then followed by the second stage of the data collection, an online survey to statistically analyse predictors of e-service use. This chapter ends with the explanation on documents and field notes as other methods of the data sources.

3.2 Research Site

This study sought to understand the main factors associated with citizens' usage of the various e-government services in Malaysia. Three service areas were focused on, namely income taxation, property taxation, and traffic fines, and in each service area, two types of e-services were considered, namely e-information and e-payment. Two of the systems were operated by the federal government (namely, income tax by the Inland Revenue Board, and traffic fines by the Royal Malaysian Police). The third system (property tax) was operated by local authorities.

3.2.1 Local Authority's Property Tax E-assessment System

The local government, or local authority, is the lowest level in the system of government in Malaysia after the federal and state governments. Being the government's lowest tier, local authorities play an important role in creating a positive relationship with the public. Local government has responsibility for providing various basic utility services, such as housing, drainage, water supply and land assessments, city planning, healthcare services, cleanliness, disease control, traffic system management, public transportation, city beautification,

licensing, and security (Cheema & Hussein, 1978). The federal government's Ministry of Housing and Local Government plays a role in monitoring the practices of local governments in Malaysia.

There are currently 145 local authorities in Malaysia (including Sabah and Sarawak), and they are divided into cities, municipalities, and districts. Cities often refer to the administrative centres of the state, having a population of more than 500,000 people. City Councils are expected to have strong financial resources with annual revenues exceeding RM100 million and be capable to spend it. Municipalities have populations greater than 150,000 people and annual revenue of more than RM20 million. Other than service providers, municipalities also ensure that it has industrial activities, businesses, and tourism to further boost employment opportunities. In other words, municipalities have a big role to provide spaces and opportunities to business by promoting growth investment and commercialisation activities. District councils are rural areas with less than 150,000 people and annual incomes of below RM20 million. All types of local authorities perform the same roles and responsibilities.

As stressed by the former Minister of Housing and Local Government of Malaysia, all the local authorities must have functional websites and should include at least e-complaints, e-submission, e-tax, e-collection, and e-licensing (Daily Express Online, 2003). In addition, the launching of Smart Local Government Governance Agenda (SLGGA) that requires all local governments in Malaysia to provide their services online also seems a good initiative by the government to ensure the local authorities provide their services by using the current technologies. On top of that, the local authorities should also optimise the utilisation of their websites to disclose as much information as possible to their community. Therefore, besides the facilities to apply business/industrial license, waste management, and public cleaning service and providing public facilities and reservation, most of the local authorities also provide assessment tax as their main revenue. Assessment tax is a local tax imposed for ownership and occupation of rateable holding situated within a council's area of jurisdiction. Through their official websites, the assessment tax service is offered in two modes, e-assessment and e-payment. As registered users, the citizens may obtain their annual assessment tax information through e-assessment service, and for e-payment, the tax payment can be made online through the same website portal. The official website portals are maintained and monitored on their own and are different from a local authority to another. For example, Petaling Jaya City Council official portal can be assessed at http://www.mbpj.gov.my/en/citizens/e-services, while Alor

Setar City Council can be reached at http://www.mbas.gov.my/en. However, as an option, the citizens can also request and pay their property taxes at the local government office counters on weekdays. Thus, the citizens have a choice to transact with the local authorities over the counter or online.

3.2.2 Federal Government's Traffic Fine E-payment System

In 2010, the government launched My e-Government (MyEG) as a one-stop portal for Malaysians to deal with any kinds of government-related services. This portal facilitates the communication between citizens and government agencies. Most of the federal government's online services are provided through MyEG, which provides an access to various government agency's services in one website. Through the MyEG portal, a citizen can perform transactions and check for details on services such as traffic fines, driving license renewal, auto insurance renewal, and road tax renewal. Traffic fines are managed by the Royal Malaysian Police (RMP) under the Ministry of Home Affairs. Under the RMP services, the citizens can use RMP Summons Information Inquiry (e-checking) and RMP Summons Service (e-payment) service. E-checking refers to the service that allows the citizens to obtain general and personal information about their traffic fines, while e-payment service allows the citizen to pay their traffic fines online. The MyEG portal can be accessed via www.myeg.com.my and www.eservices.com.my. Even though the services are offered online, equivalent offline services are also available over the counter or through phone calls to the nearby police stations.

3.2.3 Federal Government's Income Taxation E-filing System

The taxation e-filing system in Malaysia was launched in 2006 and is monitored by the Inland Revenue Board of Malaysia (IRBM). During its early implementation, the taxpayers were required to provide an e-signature (digital certificate), MyKad (Malaysian Identification Card), and transaction details in order to use the e-filing service. E-filing refers to the submitting of tax forms electronically as an alternative to the manual, paper-based method. Initially, the objectives of the e-filing system were to facilitate tax compliance and to allow citizens to conduct transactions through the Internet. By assessing the service, e-filing will automatically calculate the total payable tax. Once the processes are successful, a notification of transaction will be sent immediately. E-filing transaction has many benefits. IRBM claims that this service does not only allow the citizens to submit their tax forms through the Internet, but it also offers the service in a highly secure website. In addition, taxpayers could file the tax return

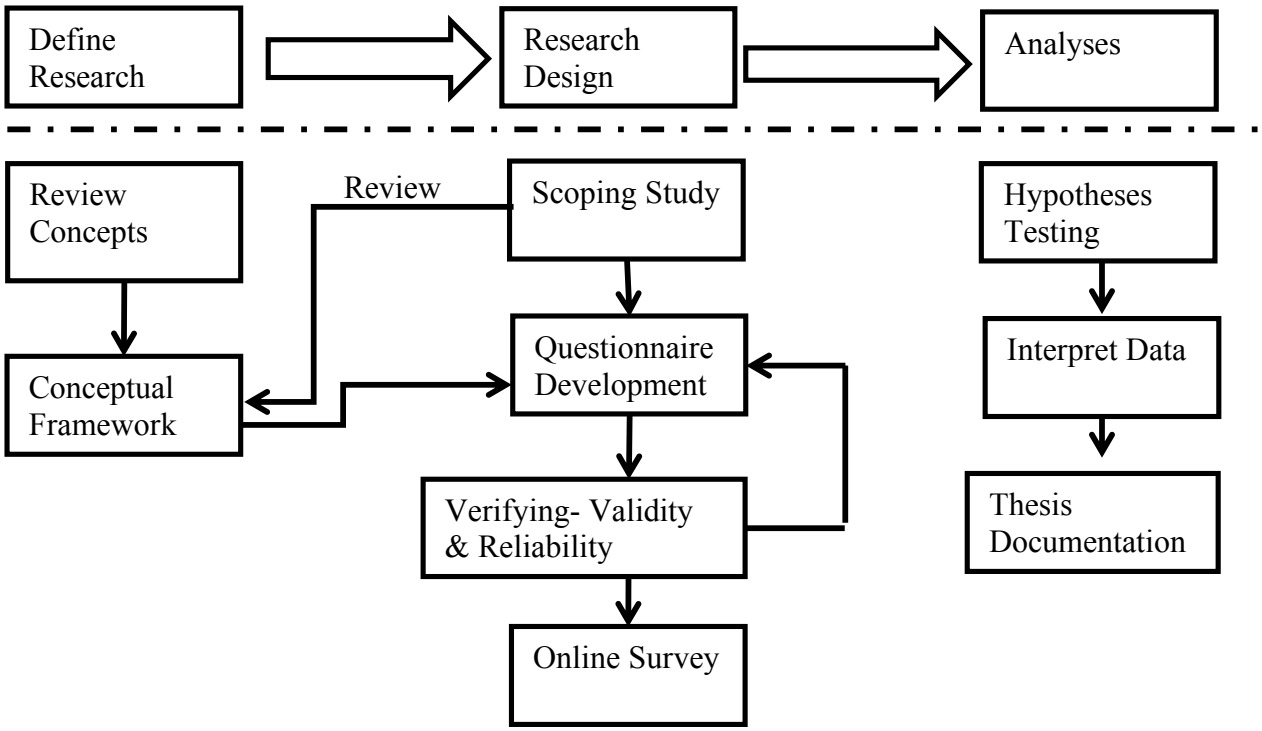
conveniently thus saving the cost and time. Moreover, e-filing reduces the delivery and printing costs for an estimate of RM8.17 million (Islam et al., 2012).

E-filing is an effective way of tax filing method, and the number of users and uses increases yearly. In 2007, a total of 50,000 tax returns were received online, scoring 25% response rate from 200,000 forms that were downloaded from https://ez.hasil.gov.my/CI/. In 2012, 2.1 million taxpayers filed their income tax form through this system (IRBM, 2012), and the tax value collected increased rapidly from RM56.8 billion in 2005 to RM74.7 billion in 2007 (The Star Online, 2007). These figures show that by employing the e-filing, the IRBM did their job well to increase their revenue. Some initiatives have also been taken by the IRBM to improve their online services. For example, in order to encourage citizens to pay their income tax online, collaboration with the local banks has been undertaken. This initiative allows the citizens an access to their bank account through the IRBM website, and payment can be done without logging in to their respective bank.

3.3 Research Process

This study used a two-stage research design. In the first stage, this study embarked on a scoping study in order to get a clear picture of the issues under investigation and to refine the conceptual model prior to a survey in the second stage. Initially, several general ideas were identified from a review of the extant literature in the related fields of study in order to understand citizens' use of e-government services. The scoping study was undertaken to identify and to confirm the presence of the constructs in the proposed conceptual framework and to identify any new constructs. Figure 3.1 presents an overview of the research procedures conducted in this study.

As illustrated in Figure 3.1, the study commenced by identifying the research problems. In general terms, the research problem was generated after reviewing and analysing the topics related to e-government usage in Malaysia. Based on a review of the extant literature, it was concluded that further investigation was necessary in order to determine the main factors influencing an individuals' usage of different e-government services in Malaysia.



Source: Adopted from Hashim (2012)

Figure 3-1: Research procedures

During the literature review phase, attention was paid to the relevant theories and findings in previous studies. Based on the extant literature and theories from related fields of research, an initial conceptual framework was formulated (see Figure 2-6). A scoping study was undertaken to further develop and refine the initial conceptual framework as well as to identify new constructs as appropriate. The constructs used in the present study were measured using scales established in previous studies (as discussed in Chapter 5). However, as this study was focused on six particular Malaysian e-government services, changes were made to the items in order to make sure they clearly reflected the context and objectives of the study. The next section presents the selected methodology for this research and provides justifications for their selection.

3.4 Selection and Justification of Research Methodology

Each method has its own strengths and weaknesses that vary based upon the topic the researcher wants to discuss. In other words, a research methodology is determined by answering the research objectives and research question of the study (Creswell, 2009). Determining the correct research methodology is crucial because it is closely related with the

conduct of rigorous research (May & Pope, 1995; Bluhm et al., 2011) and the quality of the research results (Creswell, 2009).

At the initial stage, a scoping study was undertaken to identify the key elements of the constructs in the initial UTAUT framework as well as to identify any new constructs. The results of the scoping study phase are discussed in detail in Chapter 4.

At the second stage, this study adopted a quantitative approach. As the present study aimed to gather numerical evidence of e-government use in Malaysia, a quantitative research design incorporating an online survey method was identified as the appropriate approach (Nulty, 2008). This approach is useful to study the relationships between variables (Malhorta & Galletta, 1998). Based on the research questions and objectives of the present study, the appropriate type of investigation used was a cross-sectional study in which the data were gathered at one point in time. The results of the quantitative phase of this study are discussed in detail in Chapter 5. The next section discusses the sources of data and outlines the steps taken in the selection of the data sources.

3.4.1 Stage One: A Scoping Study

A scoping study (or scoping review) is an increasingly popular approach to understand the research context, and is very popular in the field of health research (Davis, Drey & Gould, 2009). Previous studies (e.g. Rumrill, Fitzgerald & Merchant, 2010; Grant & Booth, 2009; Levac, Wishart, Missiuna, & Wright, 2009, Levac, Colquhoun & O'Brien, 2010) defined a scoping study as a procedure for summarizing a selection of evidence as a way to convey the breadth and depth of a field. According to Mays, Roberts and Popay (2001), a scoping study is a process to mapping the key concepts that underpin a research topic, supported by key sources of evidence, it is suitable where the topic area is complex or has not been reviewed comprehensively before. At a general level, a scoping study is suitable when there is a need; (1) to identify what we know and what we do not know of a phenomenon (Anderson et al., 2008); (2) to provide conceptual clarity about a specific topic (Davis et al., 2009); (3) to clarify a complex concept and refine subsequent research inquiries; and (4) to do a preliminary assessment on the concepts underpinning the research area (Arksey & O'Malley, 2005), used as the basis for a next stage of research (Daudt, van Mossel, & Scott, 2013).

A scoping study was conducted to assess if current issues covered in the literature about usage and non-usage of e-government services were adequately addressed in the Malaysian context. Although previous studies (e.g., Iyer, Baqir, & Vollmer, 2006; United Nations Report, 2008; Gauld, Graya, & McComba, 2009; Mosse & Whitley, 2009) show that currently e-government has been implemented in developed countries, it is possible that the previous studies have overlooked some contextual factors that are uniquely relevant for Malaysia. The aim of the scoping study was to get feedback and opinions about citizens' actual experiences of using e-government services from Malaysian citizens.

Face-to-face in-depth interviews were used for this scoping study (Markus & Lee, 1999; Maxwell, 1996) and twelve participants with various professions and job backgrounds were involved. Open-ended questions focusing on the general factors that influence a citizen's adoption on e-government use was asked during the interviews. This method provides in-depth views into the experience of participants.

3.4.1.1 Sampling and Recruitment

As the objective of this study was to identify the key factors associated with citizen's use of e-government services, the main criterion for the scoping study was that the participant was currently had used any e-government services in the last two years. Therefore, people who had not used any e-government services were excluded from the scoping study.

Due to financial and time constraints, the interviews were conducted at one public university in Malaysia, Alor Setar Community College and Jitra General Hospital. The recruitment process started with the researcher sending a notification email about this research, an invitation letter and the interview guide to several Heads of Department who then forwarded to their staff. Prior to the interview guide was sent to the potential participants for their reference. However, in many cases, the order of the questions was changed during the interviews according to the topics raised by the interviewees. In order to get sufficient numbers of participants, a snowball and convenience sampling technique was also used.

Malaysian citizens belong to three main ethnic groups, namely, Malays (67.4%), Chinese (24.6%) and Indian (7.3%), with a small percentage belonging to other ethnic groups (0.7%). Based on the list of potential participants retrieved from the invitation email responses, the researcher carefully selected the participants in order to ensure the number of participants was

reflected gender and ethnic diversity. Of the twelve participants in the scoping study, seven were male and five were female. In terms of ethnicity, the sample was Malay (6), Chinese (4) and Indian (2) participants. All the respondents had at least a diploma certificate, a tertiary level of education. The interviews were conducted in January 2013. Table 3-1 summarises the interviews held in the first setting for this study.

Table 3-1: First setting for the study

Organisation	Public University
Unit/ Department	Schools, Registrar, University Health Centre & Computer Centre
Participants P1, P2, P3, P4, P6, P7,P10, P12	1 Senior Lecturer, School of Accountancy 1 Assoc. Prof, School of Computing 1 Lecturer, School of Multimedia Technology & Communication 1 Lecturer, School of Economic, Finance & Banking 1 Dentist, University Health Centre 1 Senior Official, Registrar's Office 1 Tutor, School of Law 1 Senior Officer, Computer Centre

Table 3-2: Second setting for the study

Organisation	Jitra General Hospital and Jitra Community College
Unit/ Department	Pharmacy and Engineering Department
Participants P5, P11	1 Pharmacist, Pharmacy Unit 1 Lecturer, Department of Mechanical Engineering

Table 3-3: Third setting for the study

Organisation	Jitra Community College & University
Unit/ Department	Computer Centre
Participants P8, P9	1 IT Officer, Jitra Community College 1 IT Officer, UUM

At the end of interviews in the first setting, the researcher also asked the participants if they had colleagues who had used e-government services. This technique is called snowball sampling, whereby participants recommend other potential participants who are familiar with the researcher's subject (Oates, 2006). Invitation emails along with the interview guides were

sent to these potential participants. Interviews were arranged with those who agreed to participate. Table 3-2 summarises the interviews held in the second setting for this study.

The researcher then applied the convenience sampling technique, which means selecting participants who are easy to reach, willing to contribute and suitable for the subject (Oates, 2006). One IT Officer was selected from the Computer Centre and one IT Officer was selected from Jitra Community College. Table 3-3 summarises the interviews in the third setting. Figure 3-2 illustrates the sampling techniques applied for the scoping study.

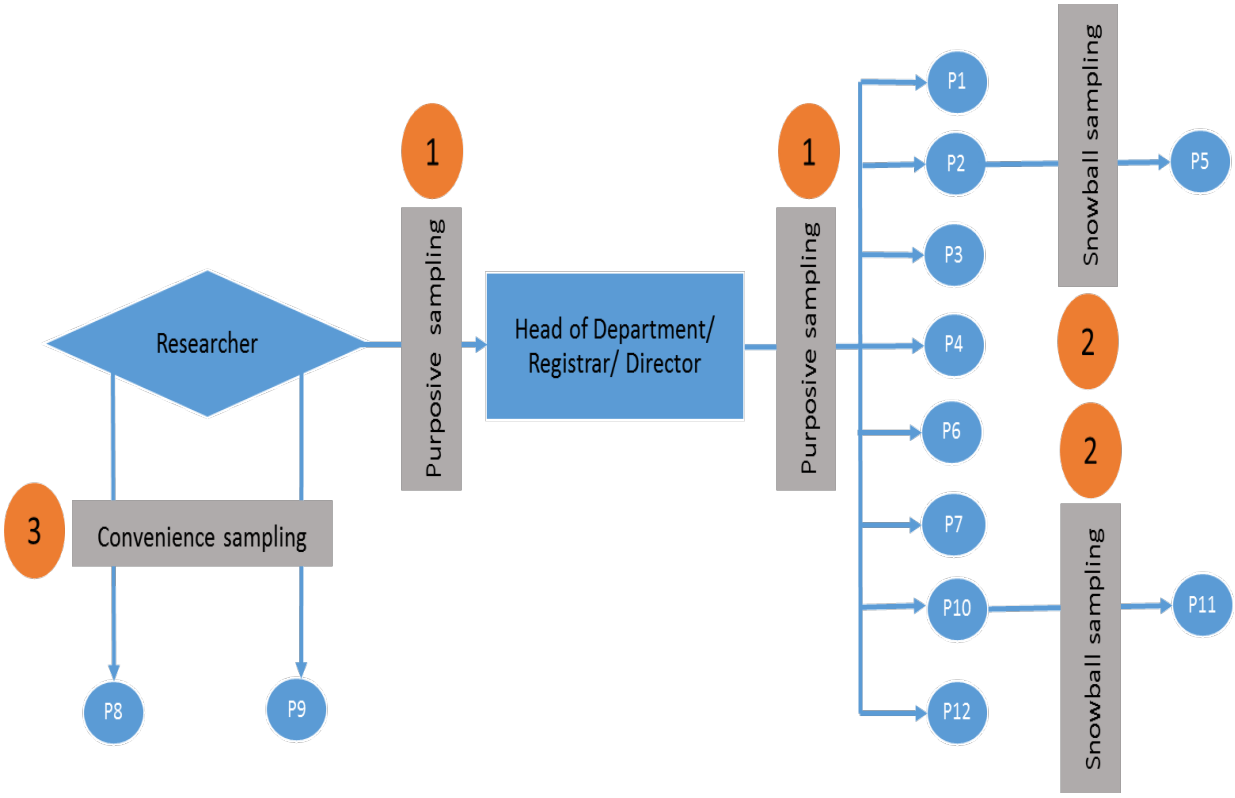


Figure 3-2: Sampling techniques for the scoping study

In qualitative research, the desirable size of the sample is still debatable. According to Guest et al. (2006), qualitative researchers should rely on the concept of data saturation to determine the sample size, where the authors believed that saturation occurs when a researcher finds no new information or themes. However, Yin (2009) states that saturation in qualitative research is normally reached after interviewing ten people. The following subsections highlight the interview process and the procedures involved during the interviews.

3.4.1.2 Interviews

Data was gathered through semi-structured interviews to investigate the topic in this study. The interviews were face-to-face and semi-structured. This enabled the participants to answer the questions and provide information with no limitations, while maintaining focus on their personal experience of e-government usage. Semi-structured interviews allow a researcher to seek information about a specific answer and to ask further questions that need more elaboration.

The purpose of the interviews in the scoping study was two-fold. First, the interviews provided a holistic view of the actual e-government usage among Malaysian citizens. As suggested by Wu (2012), a holistic picture of the study has to be drawn earlier before the researcher proceeds or determines the constructs that will be the focus of the study. Second, the themes and codes generated from the interviews would help the researcher in the next phase of the research design, namely, the questionnaire design phase.

An interview guide was used to ensure the conversations were focused on the main topics, to collect the information needed, and to ensure consistency in asking the same basic set of questions to all participants. With the guide, the researcher was able to get detailed information from the participants concerning the e-government topic and the key factors affecting e-government in Malaysia. Interviews also enable a researcher to investigate the personal experiences and feelings of the participants in depth (Rubin & Babbie, 2008).

The interview guide (see Appendix A) was largely based on concepts identified in the initial model (see Figure 2.6) namely the UTAUT model (Venkatesh et., 2003; AlAwadhi & Morris, 2009), trust in government (Rehman et al., 2012), website quality and perceived risk (Alsaghier et al., 2009). The interview guide was used as a guideline for the conversation rather than as a rigid interview protocol. The key questions for the general use of online government services included: “In the past two years, what online government services have you used?” and “When deciding whether to use an online government service, what key factors do you take into account?”. For trust and perceived risk, the questions included: “Do you believe that online government websites are trustworthy and that your data is secure? Why?”, “Do you believe that people around you are important in influencing your behaviour on online government services usage?” How and why?”. In order to gain information about the different types of usage and the reasons for using the e-service, the key questions included: “If you are using

another method to deal with a government agency, what is the method?", "Why are you using it?" and "Apart from the e-services mentioned above, are there any online government services that you have used?", "Why did you choose the system?".

The duration of the interview sessions was from 45 minutes to one hour. At the beginning of the interview, the researcher asked the interviewee for permission to use the tape recorder. Two interviewees refused and the rest were tape-recorded. During the interviews, another important issue that researchers must consider is the need to remain focused on the topic and be objective. The quality of qualitative data depends on the researcher's ability to maintain focus on the topic (Levy, 2006). In many cases, the interviewees were excited to share their personal experiences and shared personal information that they may not have been comfortable sharing through other media.

All the interviews were conducted in Malay. However, some IS-related terminologies in English were used in some of the interviews. The recorded interviews were transcribed by the researcher. For the un-recorded interviews, the researcher wrote down any significant information provided by the participants during the interviews.

The transcribed interviews were translated into English by the researcher. A copy of both interview transcripts (Malay and English) was sent to two officers at the UUM School of Modern Languages for feedback. Alterations to the transcripts were made based on their comments. In order to maintain confidentiality, the participants' name, position or any other identifying information was extracted prior to sending the transcripts. These actions were taken to reduce bias and increase the research reliability and validity (Barnes, Stuart & Vidgen, 2006; Barnes, 2011) .

3.4.1.3 Data Analysis Approach

In order to analyse the data, the researcher employed the template analysis proposed by King (2008). This technique was used because it provides a way to manage an unorganised dataset in order to discover the relationships in the data and match up the participants' views (King, 2008). King (2008) presents the seven major steps involved in the template analysis technique as follows:

1. Define the a priori themes.
2. Transcribe the interviews and familiarise with the data.
3. Produce an initial template by carrying out initial coding of the data by either attaching a code to prior identified theme or by modifying an existing theme or even developing a new one.
4. Group the themes that have been identified in the transcripts into a smaller number of higher-level codes that illustrate broader themes (categories) in the data. Researchers can use computer-aided qualitative data analysis software for this purpose.
5. Develop the initial template by applying it to all the interviews transcripts.
6. Use the final template to assist in interpreting and writing up the research findings.
7. Carry out quality checks at one or more of the coding stages.

This technique fitted well with this study for three particular reasons. First, the template offered a meaningful way to organise the data according to the themes. For this reason, this technique was appropriate with this study as it helped discover the relationships in the data and facilitated an explanation of the various experiences of the participants in reference to the factors influencing e-government use. This approach differs from inductive coding (Stewart & Shamdasani, 1990). Even though the purpose of both techniques is to condense and categorise data into themes relevant to the research objectives, inductive coding does not enable researchers to categorise data into existing codes that emerge from the theories.

Second, the template analysis fitted well with this study because the analysis started with pre-defined themes discovered from a review of several theories in the literature, followed by conducting interviews and finally end up with initial coding (King, 2008).

Third, the chosen approach for analysing the data relied on several factors such as the limited time and the purpose of the study (Lacey & Luff, 2009). As stated by King (2008), template analysis does not require long periods of time compared to other techniques (e.g., grounded theory) and therefore was suitable for the researcher's limited time.

In detail, the following sections illustrate how the researcher has applied each of the above proposed steps in the analysis of the collected data.

3.4.1.4 Application of Data Analysis Approach

This section describes the step-by-step application of the template analysis approach for the analysis of the data collected in the interviews.

Step 1: Define the priori themes

The researcher identified the themes in the existing literature about the use and non-use of e-government services, particularly in reference to the technology acceptance models such as the Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975), the Theory of Planned Behaviour (TPB) (Ajzen, 1985), the Technology Acceptance Model (Davis, 1989), and the UTAUT (Venkatesh et al., 2003). Table 3-4 presents the priori themes that were identified from the technology acceptance models in the literature, as outlined in the previous chapter (see Figure 2-4).

Table 3-4: The priori themes

1.	Performance Expectancy
2.	Effort Expectancy
3.	Facilitating Conditions
4.	Social Influence
5.	Trust in the Internet
6.	Trust in the government
7.	Quality of Website
8.	Security Concerns

Step 2: Transcribe the interviews and become familiar with the data

In this step, the process of transcribing the interviews in a Word document was completed. Translation then took place. The documents were prepared in the Malay language. The researcher completed the process of transcribing all the interviews in Malay, the language in which the interviews were conducted. In addition, data analysis occurred in the Malay transcripts, with only relevant excerpts translated for reporting. The transcripts were reviewed several times in order to become familiar with the content and to identify important aspects or issues related to e-government usage in Malaysia.

Step 3: Carry out initial coding of the data

In this step, the researcher identified the codes for meaningful analytical units by dividing, indexing and segmenting the data according to the interview transcript. Taylor-Powell and Renner (2003) suggest that researchers can choose to base the coding on the question or topic or on the case, individual or group in the analysis process. In this study, it was decided to analyse the transcripts by individual, in order to understand how each question was answered by the participant. This helped the researcher to identify the initial code of the data and decide whether to attach the code to a pre-identified theme, to modify an existing theme, or even to develop a new one.

Step 4 and Step 5: Group the themes and develop the template

Initial coding was done in Step 3, from which the template was generated. Therefore, Steps 4 and 5 were applied at earlier stages of the analysis.

Step 6: Use the produced template to assist in interpreting and writing up the research findings

The results of the scoping study were discussed in detail in Chapter 4.

Step 7: Carry out quality checks at one or more of the coding stages

In order to ensure the quality of the coding results, and before embarking on the online survey, the researcher carefully checked the credibility and generalisability of the research findings. As explained by Graneheim and Lundman (2004), the credibility of research findings is about how well the themes and categories are covered in the textual data and whether any relevant data has been excluded. By applying line-by-line coding as a fundamental step in analysing the data, the researcher ensured that all the relevant data was all covered.

3.4.1.5 Qualitative Research Quality Evaluation

In order to evaluate the validity and reliability of qualitative data, it is essential that a researcher understands the terminologies such as internal validity, external validity, reliability and objectivity which are popularly used in quantitative research. New terminologies are sometimes introduced to reconceptualise the evaluation of qualitative data using new labels (Denzin & Lincoln, 2005: pp. 19-20). For example, Lincoln and Guba (1985) propose the use

of credibility, dependability, transferability and confirmability as new labels to evaluate qualitative research. As this scoping study was designed for interpretative qualitative research, Lincoln and Guba's (1985) labels of qualitative research were adopted.

Credibility in qualitative research demonstrates that the study was conducted properly and the subject was correctly identified. Credibility in research can be strengthened by using data triangulation, prolonged engagement, peer review and by asking the interviewees to check and comment on the interview transcripts (Halaweh, 2012). As mentioned earlier, the objective of the scoping study was to identify the initial factors in e-government usage based on individuals' experiences. Therefore, with the application of several criteria, the selection of participants was purposely carried out to best meet the research objectives.

Transferability or generalisability in qualitative research, that is, whether or not the results are applicable to other situations, contexts and groups, is debatable (Dick & Swepson, 1997; Levy, 2006; Strauss & Corbin, 1998). Some scholars argue that it is not possible to generalise the result of qualitative research because such research is a process of understanding and interpreting an individual case (Janesick, 1993) and, in some circumstances, it deals with sensitive and deep insights into the complex topic that was studied (Conboy, Fitzgerald, & Mathiassen, 2012). Transferability in a qualitative study is defined as how applicable the procedures and findings are to another context and group (Graneheim & Lundman, 2004). Dick and Swepson (1997) claim that generalisability in qualitative research could be possible in the sense that the research procedures employed in one study could be applied by other researchers in diverse settings, leading to similar results and findings. This chapter described in detail the procedures that were followed in the scoping study, from defining the research question and objectives, selecting the research paradigm and design, and choosing the data analysis method. These systematic procedures can be used as a guide for other researchers who are interested in a similar topic; if applied, those studies might obtain the same results (Halaweh, 2012). This scoping study identified Perceived Trust and Perceived Risk that are relevant to the Malaysian context; if another study applies these procedures to research set in Malaysia or a developing country, it could produce the same results or extend this study's outcomes to new concepts. For example, Halaweh (2012) illustrates how the systematic process in research that involves two different approaches to qualitative analysis offers strong methodology and can be replicated by future researchers.

Dependability refers to how a researcher has managed their research, including the creation of a written record of how they prepared the interview data for the final interpretation of the textual data. Boejie (2010) claims these procedures are essential in determining the quality of the research as the researcher is able to explain the reasons for every step taken during the research process. Furthermore, proper procedures enable future researchers to repeat the work and gain the same results (Shenton, 2004). Therefore, this chapter explained in detail how the scoping study was conducted and justified all the decisions made supported by figures, tables and appendices. The interviews were only done after approval from the School Ethics Committee was obtained.

Confirmability shows that the findings and results were genuinely gathered from the data. By doing so, a researcher has to show the steps taken and the concepts and categories that emerged from the raw data, establishing that the findings are the result of the ideas and experiences of the interviewees and not of the researcher's predispositions (Shenton, 2004). Murphy and Yielder (2010) state that confirmability is about whether or not the findings can be tested and verified by other researchers.

3.4.1.6 Ethical Considerations

Before the interview was conducted, ethical approval was sought and granted from the School of Social Work and Human Services Research Ethics Committee, University of Queensland (clearance number SWASH2014/1) and shown in Appendix B. This study follows the ethical guidelines published by the National Health and Medical Research Council (NHMRC). A number of procedures were adopted to ensure participants' informed consent. Participants were informed of their right to withdraw from the research and to decline to answer questions at any time. Also, they will remain anonymous at all times and other forms of identification will not be evident. Therefore, the procedures undertaken during the data collection would pose no potential risks to the participants.

To ensure the confidentiality of the data, participant's personal information was not included in any of the findings (Bulmer, 1982). As suggested by Stake (1995) an agreement on boundaries and limits should be presented in the early stage of interview. The interviews were handled in a professional manner in that the researcher established standard interview guidelines and the interviews were conducted in a location convenient to the participants. The

confidentiality of the participants was a priority for the research. All data (softcopy and hardcopy) were kept in a locked cabinet or password-protected in the researcher's laptop.

3.4.2 Stage Two: Online Survey

The purpose of stage two was to test the revised model obtained from the scoping study by using a quantitative research approach. For that purpose, a web-based survey was utilised as this method can be used to survey a large number of people (Elling, Lentz, de Jong, & van den Bergh, 2012; Umbach, 2005). Furthermore, a web-based survey can also help to reduce the number of incomplete responses and has the advantages in terms of speed and accuracy in the data collected. The data can be automatically inserted into spreadsheets, databases, or any statistical software. These steps not only save time and money, but also reduce human error, particularly in data entry and coding. The methods in which the data in the second stage were collected and analysed are described in the following subsections.

3.4.2.1 Sampling and Recruitment

A good sampling frame is defined by how closely the selected participants represent the larger population of interest. Understanding the sample's characteristics allows a researcher to generalise the sample to represent the population (Sekaran, 2003).

The Malaysian tax office (IRBM) was used to recruit the participants due to its ownership of the e-filing database. As mentioned earlier, the main objective of this study was to understand the main determinants influencing citizens' usage of different e-government service. The target population of this study was Internet users with an experience of using e-government services. Therefore, the inclusion criterion for the respondents in this study was those with an experience in using at least one of the e-government services (i.e., personal taxation, property tax, and traffic fines). From this criterion, which was set based on the actual usage or the users' experience, the different usage of services could be identified. It was reasoned that if the users had used the e-filing system, they were likely to have used other e-government systems such as e-payment for paying a property tax and traffic fines.

The respondents for the online survey in the present study were recruited from Selangor. This state was selected for several reasons, including it has the highest population in Peninsular Malaysia, it has the highest rate of participation in the labour force, the population was having

a high computer literacy, and their e-government services were well-established among the local authorities (Department of Statistic, 2010). Moreover, the 2014 Household Use of the Internet Survey reported that Selangor had the highest percentage of broadband subscriptions and the second highest Internet penetration rate in the country (Malaysian Communications and Multimedia Commission, 2015). Given the study's focus on property tax, which is based on local government, there was a need to consider the local authorities covered by the study. In general, Selangor comprises seven Local Planning Authorities, namely, Shah Alam City Council, Petaling Jaya City Council, Subang Jaya Municipal Council, Klang Municipal Council, Selayang Municipal Council, Ampang Jaya Municipal Council, and Kajang Municipal Council. Importantly, at the time of this study, all the Selangor local authorities provided online transaction and information services and had offered payment, complaint and information services since 2008 (Ministry of Housing and Local Government, Malaysia, 2008). Therefore, all these factors made Selangor a suitable setting for this study.

The sampling method used in this study was random purposive sampling. According to Lean, Suhaiza, Ramayah, and Fernando (2009), the purposive sampling method is useful for situations where the researcher is dealing with several situations such as the need to get a right target according to the context of the study, to get a sample quickly, and when the list of the population cannot be obtained due to confidentiality.

Since such databases are strictly confidential and highly protected, an invitation to participate in the survey was distributed by the IRBM. This method was used in Malaysian tax research by Idawati and Pope (2011). The IRBM randomly selected potential respondents from its database and sent the survey invitations by email. The invitation provided the website link to the questionnaire.

There is no agreement in the literature regarding the minimum number of participants as a sample size. The larger the sample size, the lower is the error in generalising to the population (Comreyv & Lee, 1992; Kline, 1994; Saunders, Lewis & Thornhill, 2009). However, some scholars disagree with this assumption because it is not supported by any empirical evidence (MacCallum, Widaman, Zhang & Hong, 1999). Roscoe (1975) suggests that the appropriate sample size should be between 30 and 500. Other researchers suggest that 100 is an appropriate minimum number of samples (Gorsuch, 1983; Kline, 1994). However, as a rule of thumb, Hair, Black, Babin and Anderson (2009) explain that the sample size should exceed 200 in most situations. In the present study, the gatekeeper was asked to distribute 1,000 questionnaires, to

ensure that a minimum number of 200 respondents would be achieved. According to the Department of Statistics Malaysia (2014), the number of workers registered in Selangor was 2.8 million (N) people. Hence, 1,000 (n) people were randomly selected through a systematic random sampling technique.

The online survey was kept open for 30 days. SurveyMonkey.com claims that response rates increase from 25% on Day 1 to 79% on Day 31. Despite the various advantages of using an online survey method, Wright (2006) points out that online surveys face the problem of a low level of cooperation from respondents, which can lead to low response rates. Thus, it was decided that, as suggested by Dillman (2007), the online survey would be extended to another 14 days, if the response rate was low.

SurveyGizmo.com is a provider of web-based survey services and this study employed SurveyGizmo.com for the data collection. This package was selected because it makes it easy to manage the data. The SurveyGizmo.com package comes in Microsoft Excel format and allows the data to be transferred to STATA simultaneously. The SurveyGizmo.com package is also available at a reasonable price.

3.4.2.2 Survey Design and Measurement Development

The actual constructs and measurement items were developed following the scoping study. As suggested by Straub (1989), a researcher is advised to use previously validated instruments especially when employing survey methods. Therefore, in the questionnaire distributed in this study, the researcher adopted the previously validated constructs in the information systems field. The wording of each item in the questionnaire was modified to fit the context of the actual usage or users' experience (see Chapter 5, Section 5.1 for details).

The questionnaire comprised five sections. Section A of the survey explained the purpose of the study and explained that the respondent's identity would be anonymous. Sections B, C and D involved questions relating to each of the three service areas investigated in the study namely; income tax, property tax and traffic fines. As such, each section used the same set of questions and consistent structure, but modified for each service area. As the current study examined six different e-government services, the lists of questions were repeated, but modified for each e-service. All the independent variables were measured using Likert scale from 1 to 5, with 1 indicating "strongly disagree" and 5 indicating "strongly agree". However,

the measurement items for the outcome variable, namely use of e-service, were developed as a dichotomous variable. The details about the survey design are provided and discussed in Chapter 5.

3.4.2.3 Data Analysis Approach

The quantitative analysis of the data was completed in two steps. First, a univariate data analysis was used to describe the sample characteristics on the basis of frequency distributions. This method of analysis assessed the representativeness of the respondents' demographic and socioeconomic characteristics (e.g., age, gender, education, job, and ethnicity).

Regression analysis was conducted next. This test is a statistical technique that explores the relationship between independent and dependent variables (Pallant, 2007). In this study, as the dependent predictors were in an ordinal scale, a logistic regression was chosen. As the main objective of this study was to examine the relationship between predictor variables (Relative Advantage, Effort Expectancy, Social Influence, Perceived Risk, and Perceived Trust) and usage behaviour, regression analyses were done to analyse each e-government service in order to identify the factors associated with technology use. Further details about the stage two, including the survey respondents and data analysis, findings and demographic data are provided in Chapter 5.

3.4.2.4 Reliability and Validity

The validity of a questionnaire can be assessed by testing its content validity and construct validity (Straub, Boudreau & Gefen, 2004; Templeton, Lewis & Snyder, 2002). Content validity refers to the degree to which the measured items represent the dimensions of the construct. Normally, content validity is assessed through the previous literature and reviewed by experts (Straub et al., 2004). In this study, as the questions were designed in English and the targeted research participants were Malaysians, the questions were translated to Malay. The items were reviewed and validated by two academic staff at the School of Education and Modern Language, University Utara Malaysia and two staff at the Public Relation Office (Foreign Language Section), University Utara Malaysia. This step is important to ensure the items used plain language, avoided double-barrelled questions, ensured the items were clear and unambiguous, and ensured the items correctly represented the dimension of the constructs.

Construct validity is the degree to which a tool accurately measures the constructs. According to Straub (1989), a construct is valid if there is a high correlation among the measures within the same construct and low correlation with the measures in different constructs. Construct validity can be assessed by discriminant validity and convergence validity. Discriminant validity is tested to validate that the constructs measured are not correlated with other constructs. As suggested by Hair et al., (2009), the discriminant validity can be measured by comparing the average variance extracted (AVE) value with the squared inter-scale correlations of the construct. A higher AVE value compared to the squared inter-scale correlations of the construct means that the discriminant validity has been met (Hair et al., 2009). On the other hand, convergent validity is tested to verify that the two constructs that should be related are in fact related. Convergent validity can be estimated using factor loadings and the reliability coefficient. The AVE value should be at least 0.5 to ensure that the validity of the convergence is achieved (Fornell & Larcker, 1981).

Further, all the items in the independent constructs were tested using Cronbach's Alpha in order to examine the internal consistency. The result indicated that the internal consistency of the items was more than 0.60, more than satisfactory level as suggested by Churchill (1979).

Factor analysis provides the dimensionality of items, determining the number of factors to be retained for each construct and reveals the variables that belong to a particular factor (Costello & Osborne, 2005; Field, 2005). Among the available types of factor analysis, the principal component analysis (PCA) and principal axis factoring (PAF) methods are the most favoured for contemporary research (Fabrigar, Wegener, MacCallum, & Strahan, 1999; Field, 2005; Yong & Pearce, 2013). In the present study, the entire dataset was analysed separately via the PCA and PAF extraction methods, followed by both orthogonal (varimax and aquamax) and oblique (direct oblimin and promax) rotation.

3.4.2.5 Ethical Considerations for the Survey

As explained above, the study involved the IRBM as the recruiting organisation. A formal meeting was held in December 2013 at the IRBM between the researcher and the relevant IRBM officer. During the meeting, the researcher explained the purpose of the study. The main concern expressed by IRBM was the level of confidentiality for the survey participants. The researcher explained that the questionnaire would be distributed by IRBM on behalf of the researcher. This procedure would ensure that the respondents' confidentiality would be

maintained. In addition, each survey would include a cover letter that explained the purpose of the study and outlined the instructions for completing the survey. The cover letter also explained that participation in the study was on a voluntary basis, and the respondents were free to withdraw from the study at any time. On the basis of these approaches, IRBM agreed to cooperate in the dissemination of the survey. Ethical clearance was obtained from the School of Nursing, Midwifery and Social Work Research Ethics Committee (clearance number SWASH2015/1) (Appendix C).

3.5 Chapter Summary

This chapter has justified the research paradigm selected in this study and discussed the research process and the justification for the methodology chosen. In addition, the chapter has also explained the scoping study and the online survey employed as the main methods for collecting the data. An overview of the e-government services involved in this study has also been explained in this chapter. Next, the approaches used to develop the revised conceptual framework are explained in the next chapter, and the how the survey was developed and administered is explained in Chapter 5 in detail.

Chapter 4 : Scoping Study

4.1 Introduction

This chapter discusses in detail the findings of the scoping study. The aim of the scoping study was to identify the key issues associated with citizen's usage of e-government services. The main findings obtained from the interviews and analysed using a template analysis are explained in Section 4.2. The results were then used to assess the applicability of the constructs proposed in the initial model (see Figure 2.6). In addition, the subsections elaborate and confirm the constructs that will be used to revise the model. The implications of the scoping study such as revision of the conceptual model and development of the hypotheses are explained in subsections 4.3.1 and 4.3.2. Finally, Section 4.4 presents the summary of the chapter.

4.2 Main Findings

Based on the procedures and stages in the data collection and the data analysis as outlined in Section 3.4.1.3, the following key findings emerged from the scoping study.

4.2.1 Relative Advantage

In the initial model, performance expectancy was proposed as one of the constructs to measure how technology enhances user performance. Although some researchers treat relative advantage and performance expectancy as the same (e.g., Carter & Bélanger, 2005;Venkatesh, Morris, Davis & Davis, 2003), they should be measured differently because of the conceptual distinctions between the two constructs. Relative advantage is defined as citizen's belief that a new system has benefits above and beyond the current system (Carter & Weerakkody, 2008), while performance expectancy is defined as the degree to which user perceives that using particular technology would improve their job performance (Venkatesh et al., 2003). In this study, the current systems referred to offline services in the areas of income tax, property tax and traffic fines. Based on the distinction, previous studies have shown that relative advantage is a suitable construct with which to discuss the citizen's usage of e-government systems (Bhattacharya, Gulla & Gupta, 2012; Carter & Bélanger, 2005; Lean, Suhaiza Zailani, Ramayah& Fernando, 2009). This indicates that higher level of perceived Relative Advantage is associated with higher level of usage of acceptance on e-government services. This implies

that the citizen will increasingly use the online service the more benefits it is perceived to offer compared to the traditional ways. Participants explained that the online service was very useful and superior compared to the traditional method (e.g. counter service).

> *"I find e-government services [income tax system] are useful… I think using e-government services increases the effective use of my time… as well as… in handling my e-government tasks… to me, as a busy man… I would prefer to interact with the government through online." [R8, male, early 40s]*

As evident from the previous study, providing automated applications (e.g. automated calculator and integration with online banking) on the government websites has been identified in the literature as a factor that will attract people to use e-government services (Casaló, Flavián, & Guinalíu, 2007). As the citizen perceived that e-filing service offered by the current technology, one of the participants mentioned that by using the automated system on the income tax website she was able to complete her needs quickly.

> *"…in e-filing system [income tax website], it is very helpful and efficient because there was an automated tax calculation application…I just simply put the data required, and in few seconds the system pops out with the accurate amount, I clicked the payment button to pay and it is done, and for sure no more counter service after this." [R11, female, early 30s]*

Another respondent recommended government authorities to also create an integrated application or system with the private sector, especially the financial sector, in order attract more citizens to use their services. This is very useful for senior citizen to complete their needs without attending the counter. One of the senior citizen expressed this opinion:

> *"Used online payment [for property tax] because there is a link from the banking system on their website. With this link, I am happy to pay my annual property tax as I don't need to go to the counter anymore… as it happened back in 90s. Just click and done. Therefore, all government agencies have to consider this collaboration as a must … to integrate their systems with other bodies of financial sectors." [R6, male, early 50s]*

Nowadays, collaboration with other agencies is became a common practice. G2B has brought a new dimension to the government to deliver their services. For example, the public-private

partnership in the e-Seva project in India has changed the way the service delivery by the Andhra Pradesh government (World Bank, 2009). Through the project, most of the government online services were managed and offered by a one-stop centre. It was very helpful as the citizens could do many tasks in one visit. Similarly, Bhoomi Project in Karnataka India also showed that a collaboration between the government and the private agency allowed the land title to be obtained within 15 minutes, unlike the previous system that took a week (Bhatnagar, 2004).

The scoping study data indicated that most of the participants were more likely to refer indirectly to the concept of relative advantage rather than performance expectancy. Therefore, performance expectancy in this study was replaced by relative advantage as this was more consistent with the respondents' rationale for using e-services.

4.2.2 Effort Expectancy

In UTAUT, Effort Expectancy is defined that a citizen perceives e-government service is to be easy to use (Venkatesh et al., 2003). A vast review of the literature asserted that effort expectancy is one of the major factors that related to the technology adoption (Venkatesh et al, 2003; Davis et al, 1989). When the ease of using the e-government services was raised, most participants agreed that the e-government services offered such a benefit to their daily tasks. The beneficial aspects of the e-government services were expressed very clearly by many participants in this study. Ease of use, convenience, and saving time were among the reasons the participants preferred the e-government services. Most of the participants perceived that these factors made them prefer the convenience of accessing government services online, as expressed in the following statements:

> *"Very pleased with it [e-filing on the income tax system] and it is easy to perform the task. Generally, I used it to get the information on the amount that has to be paid. I like it because time-saving, convenient, the information is complete and accurate, current and always updated." [R4, female, late 30s]*

> *"Used it [e-assessment on the property tax system] for getting information on the amount of property tax to be paid. Also, to update information if required." [R1, male, late 40s]*

The result is aligned with several studies that confirmed a positive relationship between effort expectancy and e-government usage. A study by Wu, Tao, and Yang (2007) showed that effort expectancy significantly influenced the citizen's usage of 3G mobile telecommunication in Taiwan. Similarly, Effort expectancy has also been shown to be the main predictor of the intention to adopt e-filing among Malaysians (Hassan & Palil, 2012; Teck Hong & Yin-Fah, 2012).

Effort Expectancy was found to be a vital factor for some of the participants to use the e-government. But, the respondents were reluctant to use other e-services because of several reasons such as poor reliability of the system and complex website content. For example, one of the participants was reluctant to use transactional online service because of his bad experience previously when dealing with another government agency. He said:

> *"I know about the online service [e-payment on the property tax system] and for sure I am aware with its benefits such time-saving convenience but not using it due to the past experience. During the road tax renewal that cost me a lot of time because I have to spent more time to find what I am looking on their website. It's difficult for me as I need to settle it quickly…I appreciated what they did to make their website looks nice, with full of animations, colourful, but you have to remember, we are not a tourist... I log to your website because I have to do so and please make is easy to the user… "[R7, male, late 40s].*

The statements by the participants indicated that they found using the current technology was convenient, particularly to complete their daily tasks. The respondents also revealed that this technology was significantly related to the citizens continued use of e-government services as long as the service was well-maintained and all the information was updated. Previous research identified frequently updated of the website as the key factor in e-government usage (Ghani & Said, 2010). These findings were also congruent with other e-government study in the developing countries (Rehman et al., 2012; Rokhman, 2011). For example, Ease of Use was found to be a significant factor that influenced the citizen to use the transaction service provided by the Pakistan Ministry of Railways (Rehman et al., 2012).

4.2.3 Social Influence

For the purposes of the present study, Social Influence referred to the degree to which the citizen believes that others believe he or she should use e-government services. Hence, in relation to this study, citizen's beliefs regarding Social Influence were expected to have a positive relationship with the actual usage of e-government services.

One important issue that most participants mentioned was that peer influence was positively significant in determining their usage of e-government services. When the participants in the present study were asked about the influence of peers on their e-government usage, most of them agreed that the influence of friends, family and colleagues was a factor that encouraged them to use e-government services. The following two excerpts are typical examples of the views explained by several participants:

> *"At first, I did not use the online system because of the bad experience of using other systems previously; the website is incomplete, not updated, and doubtful over its data security. However, one day during my lunch, my friend mentioned about the benefits of e-payment service [property tax] that recently provided by the local authorities. After that, I had tried and until today, I have not missed to pay my property tax through online." [R12, female, early 30s]*

> *"Previously, I believed that I could explore the system [traffic fines] with my own effort. However, it takes time to use it. Then, finally I asked my family members who were familiar with that system, based on his help, everything done quickly and I am not hesitating to use it in for the next year." [R3, female, late 50s]*

A study by AlAwadhi and Morris (2009) found that the influence of peers on the intention to use technology has a greater impact than the influence of other groups (e.g. employer or government agency). However, when the participants were asked about other factors that had a major impact on their usage, especially their use of different e-government services, they mentioned advertising and the government's role as a service provider. Having experienced clear instructions from the government service provider about how to use e-services, one of the participants believed that this effort had encouraged her to use e-government services.

"Instruction is clear, easy to follow step by step… I and most of my friends… were mostly influenced by the instruction given by IRBM [income tax office] which encourages the use of e-filing." [R6, male, early 50s]

Furthermore, other participants in this study mentioned that the government could potentially encourage citizens to use e-government through their tax education programs[3]:

"The usage is mostly influenced by the instruction given by IRBM during their tax education program to my office, which encourages not just me, but most of my friends really keen to use e-filing." [R5, female, early 40s]

Most of the participants agreed that their use of e-government services depended mostly on the government's initiatives in promoting the services. As mentioned by one of the participants, they did not know about an e-government system until they saw the advertisements on television:

"As a new user… I believed… my intention to use e-government services were influenced by advertising through the electronic media and newspaper and absolutely I used MyEG for the first time after watching the advertisement on TV." [R11, female, early 30s]

One of the participants suggested that the government should conduct a promotion through greater collaboration with the private sector. The interviewee stated:

"People should see the online system [income tax system] as an opportunity to change the life style towards a more technologically savvy community. However, first of all, I think the government should focus more on promoting their e-services… not just only through the government owned mass media, but also through private owned mass media (e.g. ASTRO, TV3 -Pay-per view channels)." [R7, male, late 40s]

Therefore, besides the peers' influence, advertisements and the government's role were also identified as key factors of Social Influence. This finding is similar to the finding by Norazah

[3]Tax education programmes are designed as wide-scale activities where the main purpose is to provide instructions, exposure and awareness to the employers and taxpayers.

Mohd Suki and Ramayah (2010) who reported that external social influence and interpersonal/peer social influence have positive relationships with e-government usage among citizens.

4.2.4 Perceived Trust

An important issue about e-government implementation particularly in the developing countries is trust (Al-Adawi, Yousafzai & Pallister, 2005; Pavlou, 2003; Welch, Hinnant & Moon, 2005). The concept of trust has been studied extensively in many fields, particularly in technology adoption. Moreover, several models were also proposed to explain the trust in e-government (Horst et al., 2007; Warkentin et al., 2002). However, as mentioned by Gilbert, Balestrini, and Littleboy (2004), the concept of trust in e-government is not clear as it depends on the object that it involves. Hence, several studies were specifically related the trust in e-government with several objects such as; e-government website (C. W. Tan, Benbasat, & Cenfetelli, 2008), online tax filing and payment system (Hung et al., 2006), internet and state government (Carter & Bélanger, 2005) and information quality and service quality (Teo, Srivastava, & Jiang, 2008). For the purpose of this study, trust in e-government is related to the trust on service providers (Carter & Bélanger, 2005; Horst et al., 2007; Welch et al., 2005). Hence, as the government is the provider of the services, citizen perceptions of trust on the government are essential for trust in e-government (Papadopoulou, Nikolaidou, & Martakos, 2010).

In the scoping study interviews, the participants showed a generalised sense of trust in e-government services. The participants stated that their good experiences with the services made them feel confident in the online services provided by the current government. As mentioned by the participants, they trusted online services because they had been using the systems for several years and had never experienced any failure. They said:

> *"I used online services for almost 3 years… never encountered any problem during the transaction… so… any services provided through the Internet by the government are reliable." [R5, female, early 40s]*

> *"I was in the UK for almost 4 years. At that time, I never thought about any issues on online services because I really trust them. When I come back to Malaysia, I still used e-government services [e-payment on property tax system] and I could say, my*

experience overseas had an influence on my level of confidence and trust to the e-government services." [R12, female, early 30s]

Citizens' lack of trust regarding benefits of e-government contributed to a lower rate of adoption. Issues such as systems easily hacked, scammers, and credit card fraud activities were the major challenges for e-government adoption. According to the interviewees, lack of trust because of these problems was one of the barrier factors in adoption of e-government services. This was aligned with a report by the IRBM (2012) that mentioned the percentage of usage of their online payment was low as the citizens preferred face-to-face visits than paying online. In this regard, when the question on trust was asked, one interviewee stated:

"....many citizens do not fully trust the e-government services supplied by the government if the current government failed to show us their programme to combat the online crimes such as fraudulent activities. How come you will convince with the e-services if every day, the prime news reported the case of scammers or any similar activities?... and sadly, the cases remained unsolved. This is not about whether the services offered by private or public sectors, the issue was, what is the government roles? I don't want to be the next victim. Therefore, I would prefer to solve those payments by directly contacting the respective department". [R7, male, late 40s]

Citizen confidence in the ability of government agency to provide online services is vital to determine whether the citizens use or do not use the e-services. In has been found that, a low level of citizens' trust on the services provided by the government not only leads to a low level of confidence with technology, but also to the government itself (Thompson, Srivastava, & Jiang, 2008). Therefore, it was summarised that the high degree of trustworthiness was related to the high usage of e-government services.

4.2.5 Perceived Risk

The literature identified that one of the factors that will hinder citizens from using e-government services was perceived risk (Kim, Ferrin, & Rao, 2008). It is common for the citizens to not use online transaction because the perceived risk of using the online mode may be higher compared to the conventional mode. In addition, the lack of advanced and secure system to protect the users' financial details remained one of the main reasons most of the citizens refrained themselves from using any online services offered by the government. In this

study, perceived risk is defined as a citizen's belief about the potential uncertain negative outcomes from the e-government service use (Kim et al., 2008).

In general, perceived risk is related to the faults caused by the technological errors (e.g., duplicate purchase and an incomplete payment due to the Internet failure) and low security of an online transaction (Kim et al., 2008). In the present study, it was clear that, for most of the participants, the use of e-government services was influenced by their perception on the security of the e-services. This view was expressed by an interviewee as follows:

> *"I know about that particular service such as payment the traffic fines and renew the driving licence, through online [Royal Malaysian Police Summonses alert], but I think that the website is quite complex and I felt insecure. Importantly, I am still doubtful over the level of security provided by the service provider." [R10, female, early 50s]*

Although some participants were aware of the technological safeguards (e.g., data encryption and authentication mechanisms), some of the participants mentioned that they still feared that someone could steal their financial information during the online transaction, especially if a large amount of money was involved. For example, one participant commented on the risk in the current technologies for online transactions. But, he said he would continue using any e-government service as long as the systems were reliable:

> *"For small amount… yes, I'll do it online… but… I'm a bit cautious in making transactions when involving a large amount of money… but... as long as government concerns about their Internet security, well maintained, and good protection… for me… that's enough to make the Internet safe and reliable to transact with e-government services." [R7, male, late 40s]*

Therefore, perceived risk was significantly related to users' decision on e-government usage. It was thus clear that the citizen's perception on risk was an essential factor to be included in the proposed model as it could be expected that this factor would positively influence the actual usage of e-government services.

4.3 Implications of the Scoping Study

Based on the scoping results, it shows that several implications have been changed particularly on introducing new concepts and new factors into the revised conceptual framework and from the new conceptual framework the list of questionnaires was generated.

4.3.1 Revised Conceptual Framework

As a result, from the scoping study, the pre-identified and revised concepts are shown in Table 4.1. From the analysis of the scoping study's data, it was concluded that several constructs in the UTAUT model (e.g., Performance Expectancy, Effort Expectancy, and Social Influence) and other constructs (Perceived Trust and Perceived Risk) were identified and applied to examine the factors influencing the citizens' use of e-government services in Malaysia. Relative Advantage was identified as a replacement for Performance Expectancy. In addition, the revised conceptual model was revised as Perceived Trust in the e-government and Perceived Risk. This was because, from the interview, most of the participants were really concerned about trustworthiness and risk of the systems.

Table 4-1: Pre-identified and revised concepts

Pre-identified concepts	**Revised concepts**
Performance Expectancy	Relative Advantage
Effort Expectancy	Effort Expectancy
Social Influence	Social Influence
Trust in the Internet	Perceived Trust
Trust in Government	
Quality of Website	Perceived Risk

4.3.2 Generating of Hypotheses

For the purposes of this study, relative advantage was defined as the extent to which citizens perceive their interaction with e-government services to be better than the traditional methods. Relative Advantage may include efficiency (e.g., speedy login, fast download, and quick upload of documents) and effectiveness (ease of use and convenience) of the system (Bhattacharya et al., 2012). Various literature have suggested relative advantage is supposed to be a significant construct associated to the adoption of e-government services (Carter and

Belanger, 2005; Gilbert et al., 2004; Shareef et al., 2007). In another study, Sang, Lee, and Lee (2010) believed that using e-government among the teachers would enhance their efficiency in gathering information and in interacting with the government agencies. The positive and significant impacts of Relative Advantage on behavioural usage towards the e-government services have been examined in a number of studies (Lean et al., 2009; Rana et al., 2013). Similarly, Relative Advantage was identified as a significant factor affecting intention to use e-government (e-licensing) service in Penang, Malaysia (Pitchay et al., 2016). Meanwhile, Rana et al. (2013) found a relatively weak though significant influence of Relative Advantage on adoption intention among the OPRGS users in India. Based on the interviews, it was confirmed that the participants were highlighted more on Relative Advantage as their perceived that the e-government services were much better than previous method of service delivery. It is worth to mentioned that perceived relative advantage had a direct positive relationship with technology usage; the more unfriendly or inaccessible the e-government service, the lower the intention to use the service. Hence, this study hypothesised that:

Hypothesis 1: Relative Advantage has a positive influence on the usage of an e-government service.

In the UTAUT model, effort expectancy is the consistent factor recognised by scholars to explain the citizen's use of technology (AlAwadhi & Morris, 2008; Al-shafi & Weerakkody, 2010; Carter & Bélanger, 2005; Israel & Tiwari, 2011; Kumar, Mukerji, Butt & Persaud, 2007; Warkentin, Gefen, Pavlou & Rose, 2002). The scoping study result found a positive correlation between Effort Expectancy and e-government usage. In this study, the participants were pleased with e-government services as long as the online services provide are easily to access, convenience and frequently updated. These features encourage users to continue their adoption and could potentially enhance their usage on e-services (Kumar et al., 2007). One example is the initiative taken by the Brazilian Government to provide a Citizen Service Centre (government portal) in shopping malls where citizens could renew their driving licenses and passports and collect birth certificates (Bhatnagar, 2002). This study hypothesised that:

Hypothesis 2: Effort Expectancy has a positive influence on the usage of an e-government service.

Social influence has been discussed in the literature as a direct determinant of behavioural intention (Mohd Suki & Ramayah, 2010; Oye, Iahad & Ab. Rahim, 2012; Yu, 2012).

Similarly, previous studies that examined e-government usage in developing countries (Alshehri, Drew, & Alghamdi, 2012; Mei-Ying et al., 2012; Rana, Dwivedi, Lal, Williams, & Clement, 2017; Teck Hong & Yin-Fah, 2012) have empirically demonstrated that behavioural intention towards e-government use was influenced directly by peer's feedback. They provided an evidence of the significant effect of SI on e-services usage. It has been noted that the more the positive feedback by peers', the more likely the citizens would adopt the e-services (Andersen et al., 2010; Kurfali et al., 2017; Tan & Leby Lau, 2016). Similarly, a study by Rana and Dwivedi (2015) found that Social Influence was the significant predictor of behavioural intention towards the OPCRS system in India. The study showed that influence from colleagues, friends, and family members enhanced an individual's understanding on the technology, but also influenced their intention to use it. Based on the interviews, most of the participants agreed that social influence by peers and government would be one of the factors influencing their usage. Hence, this study hypothesised that:

Hypothesis 3: Social Influence has a positive influence on the usage of an e-government service.

Citizens' trust leading adoption on use of e-government services. Citizens confidence in the ability of the government to provide a good service is imperative for attract to the e-government use. Failure to ensure the privacy and security of personal information in government portals will hinder the provision of fully electronic services (Bélanger & Carter, 2008). Based on the interviews, it was identified that the citizen trust is depends on how the government deal with the fraudulent crimes. An increasing lack of confidence in the government's ability to implement online services may cause a lack of support among citizens. Hence, in this study, the same relationship was expected to occur, with the citizen's usage of e-government services based on the extent to which he or she trusted the service. Thus, this study hypothesised that:

Hypothesis 4: Perceived Trust has a positive influence on the usage of an e-government service.

The G2C relationship requires governments to provide high quality of protection to the user's personal details that fulfil citizens' expectations or demands. Horst et al., (2007) and Khattab et al., (2015) found that the perceived risk factor was commensurate with user satisfaction with e-government services. Perceived Risk has also been found to be an important factor in explaining technology non-use by citizens (Belanger & Carter, 2008; Karavasilis, Vrana, & Zafiropoulos, 2016; Moodley & Govender, 2016). Furthermore, in the context of e-commerce,

Perceived Risk was identified to be negatively significant in influencing intention to use of internet banking (Al-Qeisi & Al-Abdallah, 2013). Previous studies (Bélanger & Carter, 2008; Hussein et al., 2011; Khattab et al., 2015) found that the higher the level of Perceived Risk, the less likely the citizens were to use e-government, and the construct was identified as one of the significant constructs in the context of e-government research (Rana et al., 2013). Similarly, a new Unified Model of E-government Adoption (UMEGA) extended the UTAUT model by adding Perceived Risk as a specific construct (Dwivedi et al., 2017). In Malaysia, Perceived Risk was found to be negatively and significantly associated with MyEPF service among the taxpayers (Alateyah et al., 2012). During the scoping study phase, when asked about the risk on e-government services, most of the participants mentioned that this factor was one of the factors that influenced their usage of e-government services. Hence, this study hypothesised that:

Hypothesis 5: Perceived Risk has a negative influence on the usage of an e-government service.

The revised conceptual framework of Figure 2.4 is shown in Figure 4-1. It is noteworthy to mention, as the study involved six e-government services, the model was repeated six times to test the hypotheses developed according to the services.

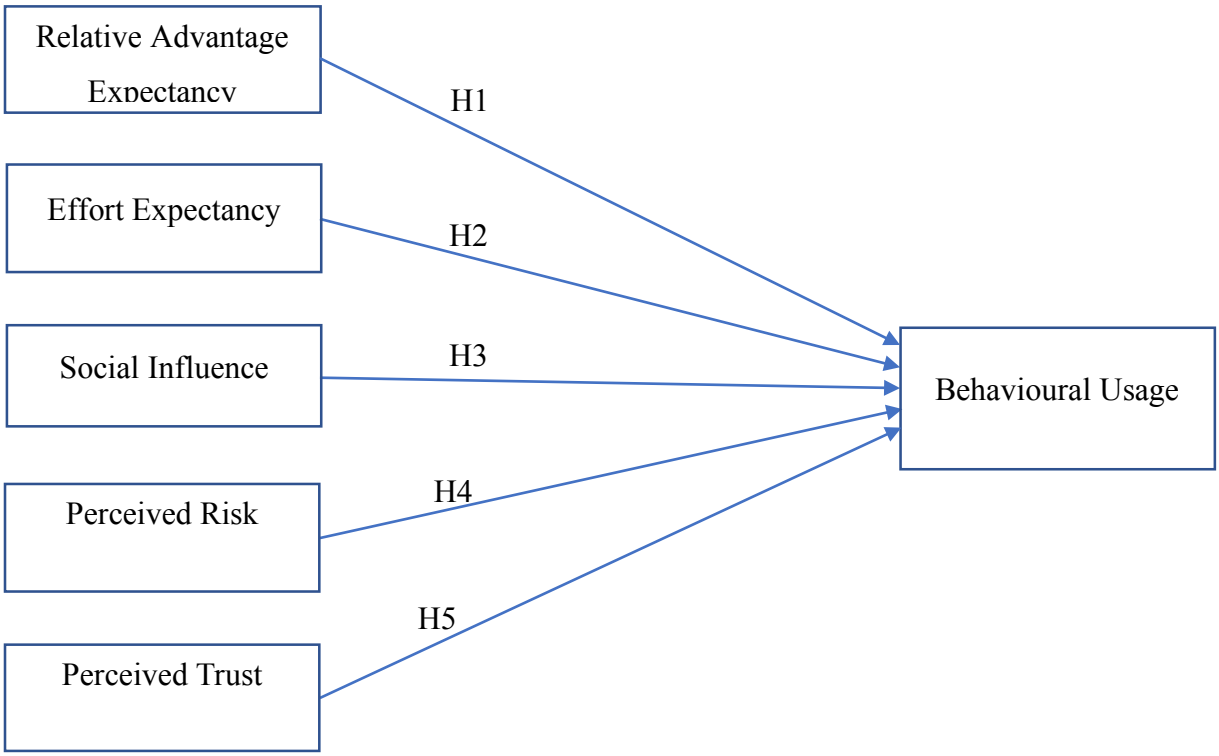


Figure 4-1: Revised conceptual model for each of e-services

4.4 Chapter Summary

This chapter has discussed the analysis approach employed for the interview data. The chapter has also presented the main findings from the template analysis. In relation with the results, the revised conceptual framework has also been presented and discussed in this chapter. Finally, the hypotheses have been developed based on the revised conceptual framework.

Chapter 5 : Data Analysis

5.1 Introduction

This chapter presents the findings of the online survey. As described in the previous chapters, this study analysed the usage and the attitudes towards usage of six e-government services offered by different government agencies. As the survey items were identified and generated based on the revised conceptual framework (Figure 4-1), the development of measurement items, and the survey format are first described, followed by the sections that describe data coding, and missing data. Sections 5.6 and 5.7 present the descriptive statistical analysis of the demographic data of the respondents and the frequency of usage of e-government services. The subsequent sections discuss the dimensionality and reliability in order to get reliable data. The factor analysis results used to assess the relationship of items to constructs are discussed in Section 5.9. Finally, multivariate regression analysis as results identify the major factors associated with the outcome variables (i.e., actual usage of e-government information and transaction services for income tax, property tax, and traffic fines). This chapter closes with a summary of the results.

5.2 Development of Measurement of Survey Items

Survey measurement items were identified based on the constructs in the revised conceptual model (as discussed in Chapter 4). As suggested by Straub (1989), a researcher is advised to use previously-validated instruments especially when employing survey methods. Therefore, the questionnaire in this study largely adopted previously-validated constructs in the information systems field, but modified for the current study context.

The measurement items for the outcome variable, namely use of e-service, were developed as a dichotomous variable. E-government studies in the literature vary in the use of scales to measure e-government usage. For example, Calista, Melitski, Holzer, and Manoharan (2010) and West (2004) used a dichotomous variable to measure the user's evaluation of e-government websites. Similarly, in a study investigating the usage of multiple-purpose e-services, Nam (2014) measured the dependent variable by aggregating binary variables (1 for "Yes" or 0 for "No"). This method of measurement for e-government adoption has also been used in developing countries (Rokhman, 2011). In this study, to measure the use of e-filing services in income tax, the question was "*In the past two (2) years, did you lodge your income tax return*

online?" similarly, the question for e-payment in income tax services was "*In the past two (2) years, did you pay your income tax bill online?"*. The details on the measurement scales for income tax services are provided in Table 5-1.

Each construct was measured by three items (see Appendix D). The items were categorised as existing and new predictors. The existing constructs in this study were Relative Advantage (RA), Effort Expectancy (EE) and Social Influence (SI). Measurement items for existing predictors were adopted from the well-established, the Unified Theory of Acceptance and Use of Technology (UTAUT) model. While the new predictors that were discovered from the scoping study and were added to the framework were Perceived Risk (RISK) and Perceived Trust in e-government (TRUS). In the current study, the design of the measurement scales of RA was based on the established measurements developed by Moore and Benbasat (1991). For example, to measure RA, they provided several items such as "*Using a PWS enables me to accomplish tasks more quickly"* and "*Using a PWS improves the quality of work I do"*. For the purposes of the present study, the wording of each item in the survey was modified to fit the context of the actual usage or user's experience. For example, the item to measure the accomplishment of tasks quickly in the e-filing system was *"I think that lodging my income tax return online accomplishes the task more quickly"*, was repeated as *"I think that paying my income tax return online accomplishes the task more quickly"* for the e-payment section. Meanwhile, the measurement items for EE and SI were adopted from the works by Venkatesh, Morris, Davis, and Davis (2003) and Mohd Suki and Ramayah (2010). Both of these studies were selected as guidelines. The study by Venkatesh et al. was the original version of the UTAUT model, and the study by Mohd Suki and Ramayah was chosen because it was implemented in Malaysia and was helpful in designing the survey as the study had the same context with this doctoral study.

While, new predictors, are those items that were discovered from the scoping study and were added as new predictors in the conceptual model. New constructs have been measured and validated by previous studies in the IS field (Alsaghier et al., 2009). The interview results revealed two predictors that might influence the citizens' usage on e-government services. In this doctoral study, risk is defined as users' concern about possible negative consequences on using an e-service, while trust in e-government is defined as the degree of citizens' belief that the word, promise, verbal or written statement of the government can be relied upon (Rotter,

1967). To measure the Perceived Risk and Perceived Trust predictors, items from (Alsaghier et al., 2009) were utilised.

The measurement items to measure Perceived Trust in e-filing included: *"I am confident that it is safe and secure to lodge an income tax return online"*, *"IRBM can be trusted to process online tax returns reliably" and "I am more comfortable lodging my income tax return with someone rather than online*". Meanwhile for the Perceived Risk construct, the measurement items for the e-filing system were "*There is a considerable risk involved in lodging an income tax return online", "Overall, it is not safe to transmit sensitive information by lodging an income tax return online"* and *"Lodging an income tax return online would take too much time"*. All the independent variables were measured using Likert scale from 1 to 5, with 1 indicating "strongly disagree" and 5 indicating "strongly agree".

Table 5-1: Operational defintions and measurement items

No.	Predictor	Operational Definition	Reference	Measurement item					
				Income tax		Property tax		Traffic fines	
				e-filing	e-payment	e-assessment	e-payment	e-checking	e-payment
1	Relative Advantage (RA)	The level to which citizens perceive interaction with the government through e-government services, superior to traditional methods	(Moore & Benbasat, 1991)	Compared to lodging my tax return over the counter, I think that lodging my income tax return online would be quicker.	Compared to paying my tax return over the counter, I think that paying my income tax online would be quicker.	Compared to assessing my property tax over the counter, I think that assessing my property tax liability online would be quicker	Compared to paying my property tax over the counter, I think that paying my property tax liability online would be quicker.	Compared to checking my traffic fines over the counter, I think that checking the traffic fines online would be quicker.	Compared to paying my traffic fines over the counter, I think that paying the traffic fines online would be quicker.
				The disadvantages of lodging an income tax return online far outweigh the advantages.	The disadvantages of paying an income tax return online far outweigh the advantages.	The disadvantages of assessing the property tax liability online far outweigh the advantages.	The disadvantages of paying the property tax liability online far outweigh the advantages.	The disadvantages of checking the traffic fines online far outweigh the advantages.	The disadvantages of paying the traffic fines online far outweigh the advantages.
				Compared to lodging my tax return over the counter, I think that lodging my income tax return online would be easier.	Compared to paying my tax return over the counter, I think that paying an income tax return online would be easier.	Compared to assessing my property tax over the counter, I think that assessing the property tax liability online would be easier.	Compared to paying my property tax over the counter, I think that paying the property tax liability online would be easier.	Compared to checking my traffic fines over the counter, I think that checking the traffic fines online would be easier.	Compared to paying my traffic fines over the counter, I think that paying the traffic fines online would be easier.
2	Effort Expectancy (EE)	Degree of ease with which users address e-government services	(Venkatesh et al., 2003)	I would find it easy to lodge an income tax return online.	I would find it easy to pay an income tax return online.	I would find it easy to assess the property tax liability online.	I would find it easy to pay the property tax liability online.	I would find it easy to check the traffic fines online.	I would find it easy to pay the traffic fines online.
				It is easy for me to learn to lodge	It is easy for me to learn to pay	It is easy for me to learn to assess	It is easy for me to learn to pay the	It is easy for me to learn to check	It is easy for me to learn to pay the

				an income tax online.	income tax online.	the property tax liability online.	property tax liability online.	the traffic fines online.	traffic fines online.
				Lodging my tax return online would be clear and understandable.	Paying my tax return online would be clear and understandable.	Assessing my property tax liability online would be clear and understandable.	Paying my property tax liability online would be clear and understandable.	Checking the traffic fines online would be clear and understandable.	Paying the traffic fines online would be clear and understandable.
3	Social Influence (SI)	Users' perception of significant others requiring them to use e-government	(Mohd Suki & Ramayah, 2010) (Taylor & Todd, 1995)	People who are important to me think that I should lodge my income tax return online.	People who are important to me think that I should pay my income tax bill online.	People who are important to me think that I should assess my property tax liability online.	People who are important to me think that I should pay my property tax liability online.	People who are important to me think that I should check the traffic fines online.	People who are important to me think that I should pay the traffic fines online.
				I read/saw advertisements that lodging an income tax return online is a good way to interact with the income tax office.	I read/saw advertisements that paying an income tax online is a good way to interact with the income tax office.	I read/saw advertisements that assessing the property tax liability online is a good way to interact with the local authority office.	I read/saw advertisements that paying the property tax liability online is a good way to interact with the local authority office.	I read/saw advertisements that checking the traffic fines online is a good way to interact with the RMP office.	I read/saw advertisements that paying the traffic fines online is a good way to interact with the RMP office.
				IRBM encourages citizens to lodge their income tax return online.	IRBM encourages citizens to pay their income tax online.	Local authority office encourages citizens to assess their property tax liability online.	Local authority office encourages citizens to pay their property tax liability online.	RMP encourages citizens to check their traffic fines online.	RMP encourages citizens to pay their traffic fines online.
4	Perceived Risk (RISK)	Users' felt uncertainty regarding possible negative consequences of using a product or service	(Alsaghier et al., 2009)	There is a considerable risk involved in lodging an income tax return online.	There is a considerable risk involved in paying an income tax bill online.	There is a considerable risk involved in assessing the property tax liability online.	There is a considerable risk involved in paying the property tax liability online.	There is a considerable risk involved in checking the traffic fines online.	There is a considerable risk involved in paying the traffic fines online.
				Overall, it is not safe to transmit sensitive information by	Overall, it is not safe to transmit sensitive information by	Overall, it is not safe to transmit sensitive information by	Overall, it is not safe to transmit sensitive information by	Overall, it is not safe to transmit sensitive information by	Overall, it is not safe to transmit sensitive information by

				lodging an income tax return online.	paying an income tax online.	assessing the property tax liability online.	paying the property tax liability online.	checking the traffic fines online.	paying the traffic fines online.
				Lodging an income tax return online would take too much time.	Paying an income tax online would take too much time.	Assessing the property tax liability online would take too much time.	Paying the property tax liability online would take too much time.	Checking the traffic fines online would take too much time.	Paying the traffic fines online would take too much time.
5	Trust in e-government (TRUS)	The degree of citizens' belief that the e-government services will perform to reduce the complexity and uncertainty of living environment	(Alsaghier et al., 2009)	I am confident that it is safe and secure to lodge an income tax return online.	I am confident that it is safe and secure to pay an income tax return online.	I am confident that it is safe and secure to assess the property tax online.	I am confident that it is safe and secure to pay the property tax liability online.	I am confident that it is safe and secure to check the traffic fines online.	I am confident that it is safe and secure to pay the traffic fines online.
				IRBM can be trusted to process online tax returns reliably.	IRBM can be trusted to process online tax payments reliably.	Local authority can be trusted to process online property tax reliably.	Local authority can be trusted to process online property tax payments reliably.	MyEG can be trusted to process online traffic fines reliably.	MyEG can be trusted to process online traffic fines payments reliably.
				I am more comfortable lodging my income tax return with someone rather than online.	I am more comfortable paying my income tax return with someone rather than online.	I am more comfortable assessing my property tax with someone rather than online.	I am more comfortable paying my property tax with someone rather than online.	I am more comfortable checking my traffic fines with someone rather than online.	I am more comfortable paying my traffic fines with someone rather than online.
	Actual usage (AU)	The citizens' actual experience of the system	(Rokhman, 2011)	In the past two (2) years, did you lodge your income tax return online?	In the past two (2) years, did you pay your income tax return online?	In the past two (2) years, have you ever assessed your property tax liabilities online?	In the past two (2) years, did you pay your property tax liabilities online?	In the last two (2) years, have you used the MyEG portal to check your traffic fines statement?	In the last two (2) years, have you used the MyEG portal to pay your traffic fines?

5.3 Questionnaire Development

The questionnaire comprised five sections (see Appendix D) that were developed based on the revised framework. Section A of the survey explained the purpose of the study and this section also provided the participant information sheet and explained the participant's consent. The submission of the survey was regarded as the participant's consent to participate in the study, and this was clearly stated in the main web page. Section A also explained that the respondent's identity would be anonymous in order to ensure confidentiality.

Sections B, C and D involved questions relating to each of the three service areas investigated in the study namely; income tax, property tax and traffic fines. As such, each section used the same set of questions and consistent structure, but modified for each service area. Each section started with a question designed to identify whether or not that service area was relevant to the respondent. For example, the questions *"At any point in the last two (2) years have you owned any property that is subject to property tax?"* was asked for the property tax section (Section C) and *"At any point in the last two (2) years, have you received a traffic offence notice?"was asked* for the traffic fines section (Section D). Respondents who answered "No" were exempted from answering the remainder of that section as it was not relevant to them and they were instructed to move to the next section. The remainder of each section asked several questions designed to measure each construct in relation to each e-information and e-payment services within that service domain. At the end of each section, the respondents were asked about their actual use of online service (informational and transactional) in the past two years (this was the dependent variable).

Section E collected respondents' demographic information including gender, age, employment, ethnicity, and respondent's experience on computer. As this study focused on Selangor State, the local authority to which respondents belonged was also included in the demographic questions as it related to the property tax being local authority administered. These data were also collected for the population representativeness in Selangor.

Overall, the survey contained 121 questions, with 36 questions each for Sections B, C and D, while the demographic section in Section E contained 13 questions. The survey was administered in Malay.

5.4 Response Rate and Data Coding

Of the 1,142 survey invitations distributed in this research by the IRBM as the gatekeeper, 363 responses were received within two months. Of the 363 responses, 49 were rejected because the respondents declined to participate, resulting in a total of 314 usable responses or 32% usable response rate. The data was collected through the web survey tool namely SurveyGizmo (surveygizmo.com).

Score reversal is used if there are negative items on the survey. In this study, for example, the negative item for Relative Advantage construct in income tax was: *"The disadvantages of lodging an income tax return online far outweigh the advantages"*. Meanwhile, the negative item for Perceived Trust was: "*I am more comfortable lodging my income tax return with someone rather than online"*. Reverse coding requires the numerical scoring scale runs in the opposite direction. Based on the example above, the highest and the lowest scores are substituted for each other, and vice versa, as shown in Figure 5-1.

Original Score		Reversed Score
1	→	5
2	→	4
3	→	3
4	→	2
5	→	1

Figure 5-1: Reverse scoring in a 5-point scale

5.5 Missing Data

Identifying the patterns of missing data was important in order to determine the correct approaches to deal with particular missing data. Data was screened and most items had less than 1% missing data. Only 19 items had missing data of greater than 1% (see Appendix E, Table E-1). As the significant p-value of the missing data was less than 5%, the missing values were treated as missing at random (MAR) (Field, 2005). According to Cohen, Cohen, West, and Aiken (2013), missing data with a minimal amount (up to 10%) will have no effect on the

interpretation of the findings. As this study only had minimal missing data, the primary method used in this study was to replace missing values with mean substitution, which is a common method used to treat a minimal number of missing data. In this method, the missing data is replaced with the mean responses for each variable (Hair, Black, Babin, & Anderson, 2010).

5.6 Demographic Profiles of Respondents

Descriptive and frequency statistics were calculated to gain insights into the demographic profiles of the respondents who participated in the survey. The results indicated that the demographic characteristics of the respondents in Selangor were slightly different from those reported by the Department of Statistics (2016). As shown in Table 5-2, in terms of sex, there was a slightly larger number of females (55%) compared to males (45%), which is close to the Selangor population (49% and 51%, respectively) in Table 5-3.

The age range of the respondents was between 23 and 63 with 58% between 31 and 40 years old, while those of between 20 and 30 years of age accounted for 18%. Compared to the report by the Department of Statistics (2016), the percentage of respondents in the age groups between 31 and 40 years old was higher than Selangor (37%), while the percentage of respondents of the age groups between 20 and 30 years of age was lower (26%) (see Table 5-4).

Eighty-two percent of the respondents were Malay. The remaining respondents were non-Malays identified as Siamese, Chinese, Indian, and non-Bumiputera. The Department of Statistics Report (2016) was used as the benchmark for comparison in terms of ethnicity. It reported that, in Selangor, the percentage of Malays was 59%, whilst non-Malays were 41% of the population, as shown in Table 5-3. In terms of job, it was categorised into two (1=Government servant and 0=Non-government servant) because the number of respondents who worked in non-government sectors was small. In the present study, 72% of the respondents were government servants, showing a slight over-representation compared to the 54% of the Selangor population as a whole, as reported in the Economic Plannning Unit of Selangor (2011).

In terms of the type of local authorities, 52% of the respondents reported that the municipal council was the relevant local authority, and 27% of the respondents reported that the city hall was their relevant local authority. Those respondents who reported the district council as their local authority comprised 21%. The Department of Statistics (2016) was used for comparison

purpose. The report stated the majority of the population (see Table 5-5) reported that the municipal council was their relevant local authority, accounting for 68%, followed by city council (23%) and district council (9%). Although the percentage between the survey and the population was slightly different, the comparison suggested that the present survey provided a good representation of local authority.

Table 5-2: Demographic profiles of respondents

Demographic	Frequency (n=294)	Percentage %
Sex		
Male	133	45
Female	161	55
Age		
20–30	54	18
31–40	171	58
41–50	49	17
51 above	20	7
Ethnic group		
Malay	240	82
Non-Malay	54	18
Experience on the Internet		
Less than 10 years	55	19
11 to 15 years	70	24
16 years and more	169	57
Jobs		
Government	213	72
Non-government	81	28
Local authority	(n= 183)	
City	49	27
Municipal	95	52
District	39	21

Table 5-3: Population in Selangor, 2016

Demographic	Frequency 5634.4 (‘000)	Percentage (%)
Sex		
Male	2861.2	51
Female	2773.2	49
Ethnic		
Malay	3326	59
Non-Malay	2308	41
Jobs		
Government	3042	54
Non-government	2591	46

Source: Department of Statistics Malaysia (2016)

Table 5-4: Population by age in Selangor, 2016

Age	Frequency 5634.4 (‘000)	Adults (%)
Less than 20	1879.1	
21–30	969.9	26
31–40	1402.6	37
41–50	718.1	19
51 above	664.7	18

Source: Department of Statistics Malaysia (2016)

Table 5-5: Population by local authority in Selangor, 2016

No.	Local Authority	Type of Local Authority	Population in 2010	Percentage (%)
1	Majlis Bandaraya Shah Alam	City Council	481,845	23
2	Majlis Bandaraya Petaling Jaya	City Council	502,913	
3	Majlis Perbandaran Subang Jaya	Municipal Council	660,967	68
4	Majlis Perbandaran Kajang	Municipal Council	616,647	
5	Majlis Perbandaran Selayang	Municipal Council	462,412	
6	Majlis Perbandaran Klang	Municipal Council	641,648	
7	Majlis Perbandaran Ampang Jaya	Municipal Council	531,639	
8	Majlis Perbandaran Sepang	Municipal Council	76,505	
9	Majlis Daerah Kuala Selangor	District Council	85,659	9
10	Majlis Daerah Sabak Bernam	District Council	65,051	
11	Majlis Daerah Hulu Selangor	District Council	97,230	
12	Majlis Daerah Kuala Langat	District Council	117,435	

Source: Department of Statistics Malaysia (2016)

5.7 Frequency of Usage and Non-usage of E-Services by System

This section discusses the categorical inclusiveness of two types of e-government services namely e-information and e-payment. Descriptive and frequency analyses were conducted to gain insights into the usage of e-information and e-payment services. A total of 294 respondents were classified as citizens whose annual incomes incurred an income tax liability. Of this number of respondents, 92% and 76% had used e-filing and online payment services, respectively. Moreover, 183 respondents reported that they owned a property that was subjected to property tax, with 43% of them had used e-assessment and 41% of them for online payments. For the traffic fine system, 116 respondents had received a traffic offence notice in the last two years. The proportion of these respondents who had checked a traffic fine online (67%) was greater than the number of respondents who had made a payment online (45%). As

shown in Table 5-6, it is clear that the percentage of users doing e-payment was less than the percentage of users doing e-information for each of the systems.

Table 5-6: The proportion of e-information and e-payment use

	Income Tax (n=294)	Property Tax (n =183)	Traffic Fines (n =116)
E-information	92%	43%	67%
E-payment	76%	41%	42%

The evidence from the survey data showed e-government services fell into one or more categories when the respondents used at least one e-service. Table 5-7 describes the percentage of these six categories. It was reported that 86 of respondents were incurred with income tax, property tax and traffic fines. The highest percentage of the respondents was those using two services for all groups of respondents (26%). There is a significant overlapping of substantial proportion (23%) among the six types of e-government users. It is noteworthy that 19% of the respondents falls in to those used four services and followed by those who used three services. The numbers of those who used five services (12%) is larger than the number of those who used only one service (3%).

Table 5-7: The proportion of respondents use for all services

Category	(n=86)
Use One Service	3%
Use Two Services	26%
Use Three Services	17%
Use Four Services	19%
Use Five Services	12%
Use All Services	23%

5.8 Item and Scale Analysis

In order to validate the items and determine the items that reflect a construct, dimensionality and reliability tests were conducted.

5.8.1 Dimensionality

Field (2005) and Hair et al. (2010) defined dimensionality as a set of items that determine the number of factors with items loading. As stated earlier, the data were examined individually according to each of the six types of e-government service. All the items for every explanatory factor were loaded individually onto one factor. The factor loading threshold was 0.4 (Field, 2005; Straub et al., 2004), with the eigenvalues greater than 1 used to decide the retained factors.

As shown in Appendix F, Table F-1, for e-filing in income tax system, three items were analysed for Relative Advantage (RA) and two items were loaded onto one factor. The eigenvalue was 1.66 and 56% of the total variance was explained. As the factor loading threshold was 0.4, two items (TinfRA1 and TinfRA3) were retained. Similarly, the items that measured all the independent variables for e-filing loaded onto one factor and achieved greater than 1 eigenvalue with 56% to 75% of total variance explained for all constructs. As the factor loading was greater than 0.4, all the items were retained except for Perceived Trust and Relative Advantage. Similarly, the income tax system e-payment service items showed the same pattern for the generated variables. Because of low factor loadings one item for Relative Advantage factor (TpyRA2) and one item for Perceived Trust (TpyTRUST3) were deleted as both items have low factor loading. All other items were retained as the eigenvalue was greater than 1 and factor loading greater than 0.4.

Appendix F, Table F-2 shows the factor loading results for property tax system. For e-assessment, it was identified that all items were greater than 0.4 of threshold except for item PinfRA2 and PtyTRUST3. Therefore, this item was excluded from the variable. Two items were analysed for both constructs and loaded onto one factor with eigenvalues were greater than 1 and the total variance was explained between 55% to 90%. For the e-payment system in the property tax, it was found that all items were greater than 1 for eigenvalue and as the factor loading are greater than 0.4, with 66% to 89% of the total variance was explained, all items were retained for further analysis.

For e-checking in traffic fines system, three items were analysed for Relative Advantage and loaded onto one factor. 62% of the total variance was explained with the eigenvalue was 1.85. As the factor loading threshold was 0.4, one item (FinfRA2) were excluded (see Appendix F, Table F-3). Similarly, the items that measured Perceived Trust for e-checking loaded onto one

factor and achieved greater than 1 eigenvalue with 59% of total variance explained. As the factor loading was greater than 0.4, two items were retained (FinfTRUST1 and FinfTRUST2). For e-payment in traffic fines system, it shows that all variables had more than 60% of total variance explained with greater than 0.4 factor loading, but one item for each contruct (FpyTrust3 and FpyRA2) was less than threshold loading. Thus, this item was excluded from the construct.

5.8.2 Reliability

All the remaining items in the independent variables were tested using Cronbach's alpha in order to examine the internal consistency. As shown in Appendix F, Tables F1-F3, the Cronbach's alpha values vary from 0.71 to 0.92 for all the items. This result indicates that the internal consistency of the items was at a satisfactory level as the value of more than 0.60, as suggested by Churchill (1979). This result can also be considered as satisfactory according to Hair et al. (2010). Therefore, the grouped items from this analysis were determined to be valid and reliable to measure the interested variables in this study. Overall, as the results were satisfying for unidimensional and reliability, the mean of each of the item was used to represent each of the independent variables identified.

5.9 Exploratory Factor Analysis

Exploratory Factor Analysis (EFA) calculates the dimensionality of items, that is, whether an item comes with a low or high loading on an intended factor and reveals the variables that belong to a particular factor (Costello & Osborne, 2005; Field, 2005). For the factor extraction and rotation, many scholars (e.g. Costello & Osborne, 2005; Kootstra, 2004; Yong & Pearce, 2013) recommend running tests with different extraction and factor options, and then making decisions based on the results. The common methods for interpreting the factor solutions are orthogonal and oblique rotation. The debate in the psychometrics literature about the best method is ongoing (Field, 2005; Russell & Bobko, 1992; Winship & Mare, 1984). In this study, the five-step EFA protocol proposed by Williams, Brown and Onsman (2012) (Figure 5-1) was adopted.

In Step 1, the size of the sample determines whether or not the data are fit for EFA. There is extensive discussion in the literature about the minimum sample size required to perform factor analysis. According to Field (2005), the rule of thumb is 10 to 15 subjects per variable. A more

lenient number is recommended by Habing (2003) who gives 50 observations or 5 times the number of variables as the general rule of thumb. However, a number of scholars (e.g. Hair, Black, Babin, & Anderson (2010) and Tabachnick & Fidell (2001)) cite the work by Comrey and Lee (1992) as a guideline for determining the sample size, whereby a sample size of 100 is considered poor, 200 is fair, 500 is very good and more than 1000 is excellent. In the present study, Bartlett's sphericity test and the Kaiser-Mayer-Olkin index (KMO-Test) of sampling adequacy was used to test whether or not the sample is large enough to run the factor analysis. As the KMO-Test result was greater than 0.5 and the Bartlett's sphericity test result was statistically significant, it was established that the data set was large enough to run the factor analysis (Field, 2005; Tabachnick & Fidell, 2001) (see Appendix G, Table G-1).

Several authors agree that, among the available types of factor analysis, the principal component analysis (PCA) and *principal axis factoring* (PAF) methods are the most favoured for contemporary research (Fabrigar, Wegener, MacCallum, & Strahan, 1999; Field, 2005; Yong & Pearce, 2013). Therefore, in Steps 2, 3 and 4, in the present study, the entire data were analysed separately via the PCA and PAF extraction methods, followed by both orthogonal (varimax and aquamax) and oblique (direct oblimin and promax) rotation.

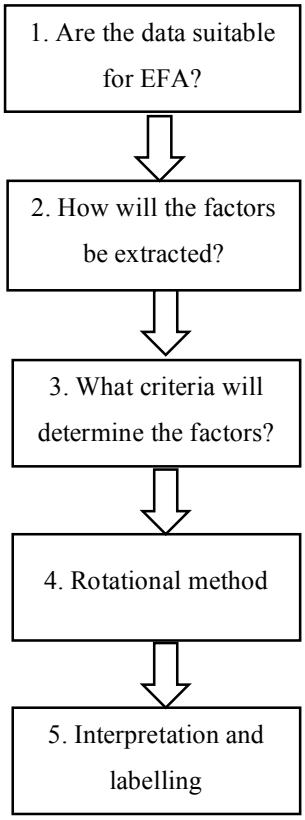


Figure 5-2: The 5-step EFA protocol (adopted from Williams et al. (2012)

Step 5 involves determining the number of factors to be retained for each construct. Field (2005) and Rietveld and Van Hout (1993) suggested three guidelines for determining the number of factors. Firstly, the factors to be retained should have an eigenvalue larger than 1. Secondly, the total variance of the factors should account for 60–80%. Thirdly, the number of factors should be determined through the scree-plot breaking point. Researchers often follow the first guideline due to simplicity as this option is the default in statistical software packages. As suggested by Yong and Pearce (2013), in order to determine the number of significant factors, using the rotated eigenvalue and the scree-plot breaking point is the recommended practice for a novice researcher. Alternatively, a researcher can determine the number of factors to be retained by specifying the factors.

Based on the extraction and rotation results, if the loading factor is less than 0.4 or if an item has a similar loading on two factors, then exclusion of the items is recommended (Field, 2005; Straub et al., 2004). A comparison of the results from the different extraction and rotation methods was made and, based on the results, 4 components were accounted for more than 60%

of the variance, thus PCA and varimax rotation were chosen in this study. As the study involved six different e-services, the extraction and rotation test were repeated for each service. For example, the results for e-filing in income tax system is shown in Appendix G, Table G-2.

5.10 Multicollinearity Test

Multicollinearity is related to the correlation matrix when there are strong correlations among the predictors in a regression model (Field, 2005). Multicollinearity could be identified when the variables are highly correlated (0.70 and above). In this study, the variance inflation factor (VIF) and tolerance readings are used to indicate correlation among predictors. The threshold for tolerance value was more than 0.20 and the VIF value was below 5.0 (Hair et al., 2010). As presented in Appendix H, Table H-1, all the constructs for all systems met these requirements, thereby indicating that none of the constructs had a collinearity issue.

A further examination of the results of the correlation matrix among the variables also were checked for signs of multicollinearity. The threshold correlation between the variables should not greater than 0.85 (Kline, 2005). The initial inspection of the Spearman Rho Correlation Matrix (see Appendix I, Tables I1-I6) for each of the regression models revealed that the correlations between the independent variables did not exceed 0.80. It was concluded that there were no multicollinearity issues in each of the systems.

5.11 Multivariate Analysis: Logistic Regression Analysis Results

This section presents the regression analysis and discusses the findings with regard to the study's hypotheses. In this section, all the hypotheses relating to Relative Advantage, Effort Expectancy, Social Influence, Perceived Risk, and Perceived Trust were tested based on the six dependent variables of the study namely use of e-filing and e-payment in income tax system, e-assessment and e-payment in property tax, and e-checking and e-payment for traffic fines. A summary of the hypotheses is as follows:

H1: Relative Advantage has a positive influence on the usage of an e-government service.

H2: Effort Expectancy has a positive influence on the usage of an e-government service.

H3: Social Influence has a positive influence on the usage of an e-government service.

H4: Perceived Risk has a negative influence on the usage of an e-government service.

H5: Perceived Trust has a positive influence on the usage of an e-government service.

Because all the dependent variables were binary measures, where 1 indicated using an e-service and 0 indicated non-use, logistic regression was used to identify the associated predictors in every model. The models were analysed with multivariate analysis that included both services, e-information and e-payment.

5.11.1 Income Tax System Use

This section presents the findings from the logistic regression analysis for the income tax system. Starting with the model presented in Table 5-8, each regression analysis predicted the degree of usage of e-filing and e-payment system with existing determinants. A likelihood ratio Chi-square test for e-filing service ($\chi 2$ (df=5) = 22.93, $p<0.003$) and e-payment service ($\chi 2$ (df=5) = 21.90, $p<0.005$) indicated that the model was significant and suggested that the model fitted the data well. Furthermore, this was supported by the value of Pseudo-R^2 statistic (R^2=0.138), indicating that the overall model quality was acceptable.

In order to identify the variables that were associated with actual usage of both services in the income tax system, all predictors were included in the multivariate regression analysis. Only two predictors were found to be significantly associated, while others were not significant. Effort Expectancy and Perceived Risk were found to be associated with e-filing and e-payment use. Effort Expectancy was found to be positively associated with e-filing and e-payment use. The value of the coefficient revealed that an increase of one unit in Effort Expectancy was associated with an increase in the odds of e-filing use by a factor of 4.22 (OR: 4.221, $p<0.05$) and 2.98 for e-payment use (OR: 2.198, $p<0.05$). The results implied that e-filing use were over four times likely when the citizens perceived e-filing service to be easy to lodge and understandable, and it was slightly decreased to more than two times likely for e-payment use.

Meanwhile, for Perceived Risk, the results revealed a negative relationship for both services, e-filing and e-payment. As citizens perceived a higher risk when engaging in online services, the odds of not using e-filing are 49% higher than the odds of e-filing use (OR: 0.498, $p<0.05$). Similarly, for e-payment, the odds of not using the service are 51% higher than the odds of e-payment use (OR: 0.514, $p<0.01$). The results indicated that the citizens were less likely to use the e-filing and e-payment service for half times if they perceived about the risk that involved and unsafe for doing any transactions.

In terms of demographic variables, only one explanatory factor was found to be associated in relation to the use of both e-filing and e-payment, namely experience. Those respondents with an Internet usage of more than 16 years were almost four (OR:3.90, $p<0.05$) times more likely to use e-filing and four and half times (OR: 4.548, $p<0.05$) more likely to use e-payment compared to those with less than 10 years' Internet usage.

Table 5-8: Multiple regression analysis for factors associated with income tax system

Predictor	E-filing		E-payment	
	OR	**S.E.**	**OR**	**S.E.**
Relative Advantage	1.346	0.566	1.217	0.422
Effort Expectancy	4.221*	2.477	2.198*	0.883
Social Influence	1.078	0.416	1.384	0.489
Perceived Risk	0.498*	0.144	0.514**	0.121
Perceived Trust	0.905	0.370	0.942	0.379
Sex				
Female	= base=			
Male	1.010	0.536	0.710	0.291
Age				
Below 30	= base=			
31–40	0.689	0.486	0.909	0.462
41–50	3.046	3.627	2.537	1.914
51 and above	0.441	0.562	2.985	2.234
Experience				
Less than 10 years	= base=			
11–15 years	3.780	2.876	3.263	1.795
More than 16 years	3.909*	2.470	4.548**	2.219
N	287		259	
Pseudo-R^2	0.1389		0.1031	
Log-Likelihood	−71.056248		−95.271359	
Log-Likelihood χ^2 (5)	22.93**		21.90**	

*$p<0.05$, **$p<0.01$

5.11.2 Property Tax System Use

Similar with the presentation of the results for income tax system, Table 5-9 includes the results for e-assessment and e-payment service in the property tax system. A likelihood ratio Chi-square test significantly predicted that the model fitted accurately for e-assessment (χ^2 (df=5) =64.37, p<0.000) and e-payment service (χ^2 (df=5) = 63.90, p<0.000), respectively. Furthermore, the value of Pseudo-R^2 statistic indicated that both models were reliable and more than 25% of the variation in the predictors was explained by the logistic model.

Effort Expectancy and Perceived Risk were identified to be associated with both e-assessment and e-payment use. The citizens who perceived that assessing the property tax through e-assessment service was easy, the odds of using e-assessment were more than five (OR: 5.395, p<0.01) times larger for Effort Expectancy, while for e-payment, a unit change increased the odds of use by a factor for almost seven (OR: 6.827, p<0.01) times. The results demonstrated that citizens were more likely to use the services when they perceived that the services are easy to learn, clear and understandable than those who did not it perceives as so.

However, Perceived Risk was found to be negatively associated (OR: 0.490, p<0.01), indicating that the higher the risk citizens perceived, the odds of not using of e-assessment are more than 50% higher than the odds of using the service. Similarly, for e-payment, the results indicated the odds of not using e-payment service are 41% (OR: 0.410, p<0.01) higher compared to those who are using e-payment service. From the results, it is clear that citizen's perceived on the risk that involved and unsecured on personal details, the usage of the services will be decreased.

Regarding the effect of the demographic variables to the e-assessment and e-payment use, Internet experience and types of local authority were found to be associated with use. In terms of experience, the respondents with an experience of more than 16 years on the Internet were almost three times more likely to use each service compared to the group with less than 10 years' experience. For the local authorities, the citizens living in the district/rural areas were less likely to use e-assessment (OR: 0.325, p<0.05) and e-payment (OR: 0.289, p<0.05) services compared to the citizens living in the city area.

Table 5-9: Multiple regression analysis for factors associated with property tax system

Predictor	E-assessment		E-payment	
	OR	**S.E.**	**OR**	**S.E.**
Relative Advantage	1.537	0.907	0.737	0.367
Effort Expectancy	5.395**	3.024	6.827**	3.313
Social Influence	1.716	0.534	1.206	0.436
Perceived Risk	0.490**	0.132	0.410**	0.125
Perceived Trust	0.547	0.249	0.636	0.278
Sex				
Female	= base=			
Male	1.485	0.527	1.192	0.423
Age				
Below 30	= base=			
31–40	1.816	1.351	3.275	2.743
41–50	2.618	2.103	4.764	4.252
51 and above	1.339	1.341	6.939	7.612
Experience				
Less than 10 years	= base=			
11–15 years	1.460	0.834	1.778	1.015
More than 16 years	2.914*	1.487	2.633*	1.347
Local Authority				
City Hall	= base=			
Municipal Council	0.695	0.288	0.605	0.254
District Council	0.325*	0.162	0.289*	0.144
N	182		163	
Pseudo-R^2	0.2578		0.2862	
Log-Likelihood	−92.637271		−79.676889	
Log-Likelihood χ^2 (5)	64.37**		63.90**	

*p<0.05, **p<0.01

5.11.3 Traffic Fines System Use

This section presents the findings for the traffic fines system. The model is presented in Table 5-10. Each regression analysis predicted the degree of usage of e-checking and e-payment system with explanatory factors. The Chi-square tests of the model coefficients showed that the model was significant at the 0.01 level for e-checking (χ^2 (df=5) = 27.35, p<0.000) and e-payment (χ^2 (df=5) = 35.37, p<0.000), suggesting that the model fitted the data well. This was supported by the values of Pseudo-R^2 that indicated 19% (e-checking) and 24% (e-payment) of the variation in the predictors were explained by the model.

Effort Expectancy and Social Influence were found to be consistently associated with increased use for both services. In fact, the results revealed that as the citizens perceived that e-checking and e-payment services in the traffic fines online were easy to learn, easy to use and understandable, for one unit change in Effort Expectancy, the odds of e-checking and e-payment use also increased by a factor of 3.27 (OR: 3.277, p<0.01) and 3.3 (OR: 3.307, p<0.01), respectively.

The Social Influence construct highlights that peers and the government promoting and advertising the benefits of online service was deemed effective. The results showed that a one unit change in Social Influence, the odds of using e-checking increases by a factor of 4.73 (OR: 4.736, p<0.01). Similarly, the odds of using e-payment also increased by a factor of 2.71 (OR: 2.713, p<0.05) but slightly lower compared to e-checking service. From the results, it implied that the adoption of both e-services would be increased up to 73% when the citizens perceived on peer's opinion and government's roles on the e-government services.

The results also showed Relative Advantage had a positive association with e-payment in traffic fines, indicating that the citizens perceived the online service to be better than the offline service. The value of the coefficient showed that change of one unit in Relative Advantage was associated with an increase in the odds of e-payment use by a factor of 4.45 (OR: 4.446, p<0.05). Regarding the demographic variables, none of three potential factors was found to be associated with both e-services.

Table 5-10: Multiple regression analysis for factors associated with traffic fines system

Predictor	E-checking		E-payment	
	OR	**S.E.**	**OR**	**S.E.**
Relative Advantage	1.281	0.474	4.446*	2.844
Effort Expectancy	3.277**	1.324	3.307**	1.497
Social Influence	4.736**	2.286	2.713*	1.230
Perceived Risk	0.898	0.240	1.019	0.340
Perceived Trust	0.483	0.248	0.738	0.353
Sex				
Female	= base=			
Male	0.656	0.284	1.194	0.499
Age				
Below 30	= base=			
31–40	1.347	.756	1.070	0.620
41–50	0.784	.559	0.563	0.415
51 and above	1.164	1.059	1.079	0.971
Experience				
Less than 10 years	= base=			
11–15 years	0.575	0.373	1.211	0.763
More than 16 years	0.785	0.435	1.120	0.588
N	116		106	
Pseudo-R^2	0.1859		0.2423	
Log-Likelihood	−60.298079		−55.314082	
Log-Likelihood χ^2 (5)	27.53**		35.37**	

*p<0.05, **p<0.01

5.12 Chapter Summary

This chapter has presented the empirical results and the discussions that focus on demographic, descriptive statistics, reliability, dimensionality, multicollinearity, as well as the testing results by using multivariate analyses. Logistic regression analysis was used to investigate the determinants for the citizens' actual usage on e-government services such as income tax, property tax, and traffic fines. The factor analysis and multicollinearity analysis reported that the survey was reliable and valid for further analysis. The next chapter provides a discussion on the main findings, which are supported by the previous studies related to the theoretical constructs.

Chapter 6 : Discussion and Conclusion

6.1 Introduction

The purpose of this study was to investigate of citizens' use of different e-government services in Malaysia. From the extant literature, this study identified several factors related to the citizens' use of e-government services. In addition, previous studies showed there are different patterns of citizen use of e-government services, particularly in developing countries. This study involved six e-services offered by different government agencies. Therefore, this study was unique as it extended the UTAUT model proposed by Venkatesh et al. (2003) in the context of various uses of e-government services and examined whether the identified factors were different by the type of services.

In the first stage, a scoping study of Malaysian citizens was undertaken to understand the nature of how users determined their use of different e-government services. The conceptual framework was revised, and a survey was formulated. The survey response was used for testing the proposed predictors using regression analysis.

This chapter provides a discussion on the findings and offers conclusions based on the results presented in the previous chapter. This is then followed by a discussion on the differences of usage between e-information and e-payment service. This chapter also highlights the contributions of the study, and the limitations in Section 6.3. This chapter ends with some suggestions for the future research.

6.2 Discussion on the Survey Findings

The principal aim of this study was to investigate the predictors of citizens' use of different e-government services. In order to answer the proposed research questions and hypotheses, multivariate analyses for income tax, property tax, and traffic fines were conducted. This section discusses the findings of the analysis in accordance with the research questions and hypotheses. In summary, all results of the regression analyses used to test the hypotheses are summarised in Table 6-1.

Table 6-1: Summary of the results by hypotheses

Research hypothesis		Result					
		Income tax		Property tax		Traffic fines	
		e-filing	e-payment	e-assessment	e-payment	e-checking	e-payment
H1	Relative Advantage has a positive influence on the usage of an e-government service.						Supported (OR: 4.446) *
H2	Effort Expectancy has a positive influence on the usage of an e-government service.	Supported (OR: 4.221) *	Supported (OR: 2.918) *	Supported (OR: 5.395) **	Supported (OR: 6.827) **	Supported (OR: 3.277) **	Supported (OR:3.307) **
H3	Social Influence has a positive influence on the usage of an e-government service.					Supported (OR: 4.736) **	Supported (OR: 2.713) *
H4	Perceived Risk has a negative influence on the usage of an e-government service.	Supported (OR: 0.498) *	Supported (OR: 0.514) **	Supported (OR: 0.490) **	Supported (OR: 0.410) **		
H5	Perceived Trust has a positive influence on the usage of an e-government service.						

*p<0.05, **p<0.01

6.2.1 Drivers of E-government Use

After about a decade of e-government in Malaysia, a common perception from the Malaysian citizens to e-service use seemed to be the **Effort Expectancy**, which was the most dominant factor that influenced the citizens' use on e-services. This was apparent in both e-information and e-payment for each of the services. As shown in Table 6-1, Effort Expectancy clearly appears to be a driver across each of the services. This result implies that Effort Expectancy was identified as the main determinant of e-government use regardless of whether the service was offered by the federal or the local authority. Thus, this finding supported the hypothesis H2 for all the services.

Many previous empirical studies have investigated the effect of Effort Expectancy in influencing the citizens' use on e-government (Carter, Shaupp, Hobbs, & Campbell, 2011; Kurfali et al., 2017; Rahman et al., 2011; Weerakkody, El-Haddadeh, Al-Sobhi, Shareef, & Dwivedi, 2013; Wu et al., 2007; Yahya et al., 2011; Yu, 2011; Zuiderwijk, Janssen, & Dwivedi, 2015). In the context of this study, Effort Expectancy referred to the citizens perceiving that e-services was ease to learn, ease to use and ease to understand. The findings revealed the government's role to fully utilise the existing technology in order to maintain its easiness and effortless. For example, government agencies have to consider a user interface technology as most of the citizens found and perceived it easy to access the service using a mobile phone. Hence, a well-designed user interface is required to run the services on phones or tablets. Thus, a huge investment is required to make it applicable. Moreover, during the interview, the participants showed enthusiasm for e-government use, as they perceived that through the mobile applications, they could pay all the utility bills easily. In other words, the provision of suitable services provided with the latest technology may encourage more citizens to use these services. For example, services such as those provided by IRBM, MyEG, and most local authorities in Malaysia have added a new feature to their website namely the Financial Process Exchange (FPX). This feature allows users to pay their taxes and fines through Internet banking that can be accessed via the respective government websites. This feature facilitates transactions as it is directly linked to the users' account without opening the bank's website.

The result was consistent with the previous studies that also identified Effort Expectancy to have a high impact on technology adoption (Khattab et al., 2015) particularly among local authorities in Malaysia (Pitchay et al., 2016; Zahari, Ariffin, Zamin, & Noor, 2014). Effort Expectancy especially in terms of user friendliness of the service was also found to be

significant in both assessing information and conducting transaction with the respective local authority's website. A study by Zahari, Ariffin, Zamin, and Noor (2014) showed that an initiative by the Shah Alam City Council (MBSA) to offer a wide range of online banking services on the their official website had increased usage as citizens had a another option to use the online payment even though the citizens had different bank accounts.

As mentioned in Chapter 2, local authorities have the responsibility to develop, maintain, and update their website frequently. Today, government agencies including the local authorities are committed to promoting civic engagement by offering information and services through their official portal. Therefore, in order to enhance Effort Expectancy, the portal should have a design that is user-friendly and suitable for users with different levels of computer literacy. A good website not only provides sufficient information needed by users, but, it should also be able to be used effortlessly by all types and levels of users (AlAwadhi & Morris, 2009; Zaman, 2010). Therefore, the development of strategies with an emphasis on the benefits of online services should be a priority. As mentioned by one of the participants involved in the interview:

> *"People should see this as an opportunity to change their lifestyle towards a more technology-savvy community, but the major role is to ensure that the websites of the local authorities are accessible, accurate, and updated" [R3, female, early 50s].*

The interviewees were aware and admitted that providing e-services through websites was effective. However, any drawbacks related to the local authorities' websites, such as being incomplete, not updated, and doubtful data security, should be avoided as these factors would eventually cause a low usage among the citizens.

The interview participants perceived the ease of use of e-payment service as rather positive. Effort Expectancy was a predictor, suggesting that MyEG should maintain and ensure their portal websites are always accessible, useful, and usable. This result is inline with the study by Adams, Nelson and Todd (2012), who reported that the higher the citizens perceived the ease of use of a service, the more likely they would adopt the service. During the scoping study, it was obvious that Effort Expectancy was the main factor among the interviewees when they were asked about the reason for choosing some e-government services. Most of them believed that once a service was available online, it meant it was easy to use and access. However, as the MyEG services were considered new, this study found that the usage of the service was low because citizens did not know about the service, particularly when the transaction process

had been upgraded to integrate with the local banks. For example, due to lack of an advertising campaign to expose the benefits of the service to the public, one of the interviewees, who was convinced that the traditional method of doing any transaction was better than the online method, and who believed that there was no need to change it, said:

> *"Frankly speaking, I know about MyEG and but I have no idea what the benefits of the service are except to renew the road tax and insurance and to check the traffic fines. Until today, my family and I believe that paying the traffic fines through the counter is convenient and safe because the transaction receipt is given when the transaction is done" [R12, female, early 30s].*

Besides the campaign by the government, the efforts to increase the e-service capabilities are also crucial. However, these efforts to increase the efficiency of government are likely to increase the operational and infrastructure costs and eventually lead to failure due to cost over run (Idawati & Pope, 2011). In Malaysia, due to the attitudes of citizens who prefer to pay their traffic fines at the last minutes, there will be a high volume of traffic to the server. Because of this, MyEG have to ensure their services are capable to work with the online traffic levels (Che Azmi & Bee, 2010). Therefore, the investment to increase server capabilities to handle the large volume of transaction simultaneously is highly supported.

As e-services were developed with encrypted websites, they provide security to the transaction, and offer convenience and easiness to the users. The study's result was inline with the findings by Mohd Suki and Ramayah (2010), who mentioned other people's perceptions on the benefits of using e-government were associated with technology adoption. Additionally, this result also indicated that the citizens who are frequent users will still consider the easiness of the systems in deciding to use it. As one of the participant said:

> *I believe in the future, sooner or later, more people looking for e-services. As everybody now has their Facebook, Twitter account, now with mobile technology, it is even easier to update or access your taxes while on the go" [R7, male, late 40s].*

Therefore, in pursuit of meeting citizens' expectations, the governments should proactively anticipate new technologies and then provide appropriate services with ease of use as the main factor. Given the consistent effect of Effort Expectancy in each e-services studied, the findings also suggest that government agencies should continuously improve their e-services in order to fulfil the citizens' needs. Furthermore, in order to spread the benefits of e-services,

promoting the services on popular applications such as Facebook, YouTube, and Twitter is also suggested.

Perceived Risk was also identified as a predictor to the actual use for both income tax and property tax services, but not for traffic fines services. Although the relationship was significant, the direction was negative. This result meant that the higher was the perceived risk, the lower was the usage of e-services, and vice versa. This result supports a previous study that revealed most of the respondents had a serious concern on the privacy issue (i.e., high risk on their personal details) especially when dealing with online transactions (Kaur & Rashid, 2008). In general, the citizens' perception towards the usefulness of the online services would decrease when any transactions were involved, which in some studies, it was proved that Perceived Risk had a higher priority than other factors such as Relative Advantage, Perceived Trust, and Social Influence (Belanger & Carter, 2008; Rehman et al., 2012).

This result was perhaps due to the action taken by local authorities to provide their online service through highly encrypted website, which has greatly influenced the level of confidence among the users towards the online services. According to Che Azmi and Bee (2010), a reduction in the risk perception towards e-services will not only increase the public's perception towards their usefulness, but will also encourage them to adopt the system. Therefore, it is important for local authorities particularly city and municipal areas, to actively promote the benefits of the services to the public. One interviewee insisted that providing a very good service is not enough to encourage the public to use it if the citizens' perception towards the risk existed. He claimed:

> *"...that is just a simple thing, only to get information on the amount of land tax to be paid, but because this service is considered new, this simple thing is perceived to be risky, and I prefer not to use it for transaction" [R7, male, late 40s].*

However, surprisingly Perceived Risk was not associated with traffic fines services use. Perhaps, a possible explanation for this result was the collaboration of MyEG with the local banks that had improved the services provided by MyEG particularly in terms of security system, which was compulsory in all the transactions. This effort is likely influenced the citizens' perceptions on risk. As a result, Perceived Risk was not associated with traffic fines services. The result was confirmed from the interview as one of the participants said: "...although the MyEG website needs some improvement, I am using that online services

because the integration between MyEG services and the local banks makes things trusted and reliable" [R11, female, early 30s].

The study found that **Social Influence** was significant for both traffic fines services, but not for the other services. This result supported previous studies that found Social Influence to be significant in the adoption of a technology (Colesca, 2009; Horst et al., 2007; Thompson et al., 2008). Social Influence refer to the state when citizens perceive that peer's influence (Taylor & Todd, 1995; Venkatesh et al., 2003) and external factors (e.g., advertisement/mass media and government's role) (Mohd Suki & Ramayah, 2010) are important in deciding to use the system.

To recall, MyEG is introduced in 2010 and it is a relatively new system in Malaysia compared to income tax and property tax system. Meanwhile, e-filing was introduced in 2006 in the Malaysia, and it was not surprising when Social Influence was indispensable for improving the trust and confidence of the citizens to use the new technology. The finding of this study was inline with the study's expectation that an adoption of new technology would positively be associated with peers' influence. As stated by Rodgers (1995), when the society was exposed with the new technology, their choice to accept or reject the use of the technology, and whether the technology was adopted quickly or slowly, was based on their peers' preferences.

An earlier study by Lean et al. (2009) that measured Social Influence using DOI model, suggested that Social Influence had an influence in determining the use of e-government services such as e-filing in Malaysia. A year after that, the research conducted by Mohd Suki and Ramayah, (2010) also showed similar result and reported that social norms had a significant effect on e-filing use in Malaysia. One of the possible reasons for this finding was that, at the time of that studies, e-filing was just launched and was in an early stage of implementation where it was considered a pioneer e-service in Malaysia (Ibrahim & Pope, 2011). The result was consistent with the previous studies that examined the direct relationship between Social Influence and technology adoption (AlAwadhi & Morris, 2009; Hung et al., 2006; Lean et al., 2009; Rotchanakitumnuai, 2008). As stated by one of the participants:

> *"... the most important thing when you are dealing with new emerged online services is peers' opinions especially for a new service like e-checking. This is necessary to build trust in using that service." [R3, female, early 50s].*

However, this study found that when an e-service was well established Social Influence was no longer relevant for use. Social Influence showed no association with income tax and property tax use. As already noted, as the income tax services were introduced a decade ago, during the period, there were a lot of improvements implemented by the IRBM. It could be due the fact that income tax system was more mature compared to other e-government services in Malaysia. Thus, Social Influence was not a priority as the citizens believed other factors (such as Perceived Risk and Effort Expectancy) were more important. Table 5-2 indicates that most of the respondents had an experience on computer more than 15 years. Therefore, it was likely that the citizens with more experience were more concerned on the risk. Experience with inconsistent performance would lead the citizen to less likely embrace the benefits of the services (Lean et al., 2009)

A possible explanation for this might be that, as the experience was identified significant for both e-services, it could be the reason Social Influence was not relevant, as the users were familiar and had an experience with the services. Or, as these services were required for citizens to file and pay their income tax/property tax yearly, it became a routine and other people's opinion about it was not needed. However, the result was different from some published studies (Nugroho, 2015; Ramayah et al., 2008) that reported Social Influence to be significantly associated with e-service use.

The literature suggested that there is a relationship between **Relative Advantage** and technology use (Lean et al., 2009; Pitchay et al., 2016). Besides Effort Expectancy and Social Influence, the results also indicated that Relative Advantage was identified as a determinant when the citizens dealt with e-payment service in the traffic fines service, while other services were not associated. The result explained that a high level of perceived Relative Advantage was associated with the increase in the use of online payment among the citizens. This finding strongly supported that the actual use of e-payment was largely due to the citizens' perception towards the benefits of the service. The result was consistent with the findings in the studies by Alomari, Sandhu and Woods (2010) and Sang, Lee and Lee (2010). The authors explained that citizens who realised the benefits of current technology over the traditional method would more likely to use e-government. However, in this present study, this factor was not associated with income tax and property tax services.

The result shows that the Malaysian citizens were 45% likely to pay their traffic fines through online if they perceived that they would get better benefits compared to face to face service.

This result may be explained by the fact the e-payment in traffic fines service was considered new, thus the users' perception towards the capabilities of the e-services was crucial. As mentioned by Agarwal and Prasad (1999), decline to use of e-government services occurred when the citizens were likely disappointed with the features and capabilities of the e-services. This was because the benefits of these e-services depended on user's perceptions. This finding was contradict with the study by Ramayah et al. (2008) who investigated the factors that influenced the citizens' use on e-filing during the early stage of its implementation. A study reported the unfriendliness of the e-filing service. The citizens had to go to the IRBM counter to buy the 16-digit PIN number before they could access the online service. This procedure had led to the negative perceptions and directly contributed to the lower intention to use the service. As a consequence, in 2007, it was reported that less than 8 percent of 2.5 million taxpayers used the e-filing (Ibrahim & Pope, 2011). Hence, the benefits of e-services were not perceived due to the complexity of the service (Ramayah et al., 2008). Therefore, the results of this study indicated the citizens were likely to view e-payment service as being more advantageous compared to the counter (face-to-face) service. The benefits such as quick information retrieval and transaction completion, convenient, and reduced turnaround should be told to the public frequently. Meanwhile, one possible explanation for the insignificant relationship between Relative Advantage and income tax and property tax services was that the users did not associate the services to be better in terms of service delivery than the manual method.

Finally, as the citizens perceived that trust had a major impact to the e-government use, the use increased when **Perceived Trust** increased, showing that this factor was also important in determining the e-payment use. The same conclusion has been discussed by Chatzoglou, Chatzoudes and Symeonidis (2015) and Colesca (2009). The authors added that when citizens perceived the government to guarantee the security of their personal data, they were more likely to use e-services.

However, Perceived Trust was found no effect to each of the e-services studied. It explained that perceived trust among the Malaysian citizens is not a factor that will influence to the e-government use. The possible reason for this result was due to the role of the other factors. For example, from the results, compared to other factors, it was found that Effort Expectancy has higher effect to the e-assessment (OR: 5.3) and e-payment (OR: 6.827) service on property tax. The results implied that citizens were more likely to use e-government service because of the easiness and quicker the services rather than other factors in order to fulfil their needs.

Meanwhile, one of the possible reason that leads to the lack of a relationship between Perceived Trust and income tax usage is due to the fact that, as the income tax service was well-established, it had brought a higher level of confidence to the citizens (Santhanamery & Ramayah, 2012). Therefore, Perceived Trust was not an issue for e-filing and e-payment services.

Therefore, the government is recommended to improve their online interactions with the citizens because this action was identified as efficient in increasing the Perceived Trust particularly for transactions that requested financial details (Tolbert & Mossberger, 2006). A study conducted in Malaysia found that the citizens' level of Perceived Trust on e-service turned down when they dealt with an online payment (Hussein, Mohamed, Ahlan, et al., 2011). A study in Jordan by Khattab et al. (2015) stressed that developing the citizens' trust had become a crucial factor that would drive the success of e-government in the country. This was reflected to the earlier findings on the scoping study, in which a participant suggested service providers tackle this issue. Thus, the initiative taken by MyEG to cooperate with the local banks had brought a good improvement to the service besides gaining the citizens' trust. For example, one participant expressed this point when she said:

> *"I admitted...in early year of MyEG implementation, I had a problem. I still doubted the level of security provided...I was reluctant to make any transaction online. The account could easily be accessed using Identity Card (IC) numbers. However, my perception has been changed when the local banks are involved in the system. All payments are done online because the cooperation makes things a lot easier. It provides confidence in the security systems, and people have no worries about their transactions at all" [R11].*

6.2.2. Level of E-information Versus E-payment Services.

As shown in Table 6-2, the findings provide a support for the second research question, but they also differ according to the type of services, namely e-information and e-payment.

Table 6-2: Summary of level of e-information and e-payment services

Predictor	Type of Services					
	E-information			E-payment		
	Income Tax	Property Tax	Traffic Fines	Income Tax	Property Tax	Traffic Fines
Relative Advantage						Support
Effort Expectancy	Support	Support	Support	Support	Support	Support
Social Influence			Support			Support
Perceived Risk	Support	Support		Support	Support	
Perceived Trust						

Effort Expectancy is defined as how easy it is to use the system (Venkatesh et al., 2003). Effort Expectancy is significant in various innovations and has been widely discussed in previous studies (Akram & Malik, 2012; Holden & Karsh, 2010; Rahman et al., 2011; Venkatesh et al., 2003; Weerakkody et al., 2013). In this study, Effort Expectancy was found to be a strong factor that was associated for both e-information and e-payment for each of the services. The result implied that the Malaysian citizens relied on the easiness and user-friendliness of e-services, regardless whether the services were offered by the federal or the local authority and regardless of e-information or e-payment. The findings also highlighted that Perceived Risk was also identified to support the income tax and property tax services, but not for traffic fines services. In addition, there is no difference in Perceived Risk between e-information and e-payment services for all services. This finding was consistent with the past study that found the Perceived Risk significantly and directly affected the e-filing use (Teck Hong & Yin-Fah, 2012).

However, surprisingly, the survey finding did not support the relationship between Perceived Risk on e-checking and e-payment use on traffic fines systems. As mentioned by Che Azmi and Bee (2010), some constructs were influenced by other constructs in explaining the system use. Moreover, in their study, the effect of Perceived Risk towards adopting a system was positively influenced by Perceived Trust. Thus, this finding may help to understand as the

citizens were dealing with a new online service, they were more concerned of their peers' opinion and easiness of the service rather than Perceived Risk.

Meanwhile, for e-payment type of service, based on the results, Relative Advantage was only identified to be a predictor for e-payment in the traffic fines service. Thus, it implies that citizens perceived that the online services were better than the face to face services. The statistical result revealed that the odds of use was almost 45%, that indicating the citizens were likely to use e-payment compared to other method of services. The result implied that the citizens were confident and convinced with the benefits of e-payment service, even though the service was considered new. For e-information, Relative Advantage was found to be not associated with any services. This contradictory result may be due to the government's failure to synchronise their system with the new technology. In the scoping study, it was found that the participants had to call their respective local authority because the online system failed to process their assessment tax properly. Carter and Weerakkody (2008) highlighted that by providing extra benefits such as convenient access and prompt service, the benefits of the service would diffuse throughout society quickly, hence offering a high use among the citizens. Therefore, the government agencies had to respond quickly and keep updated with the current technologies particularly that related to the social media such as Facebook, Twitter, and YouTube. This was as highlighted by a previous study that the government role will be enhanced with to the technology use (Henman, 1996, 2013).

Social Influence was identified as a factor for usage of e-information and e-payment services for traffic fines services only. The result revealed that Social Influence was associated with e-checking and e-payment in traffic fines system, but not for income tax and property tax services. As mentioned before, MyEG was the latest system used in this study. Therefore, the results suggest that peers' and government advertisement feedback was needed to encourage the citizens to use the e-services. This finding was inline with the study by Al-shafi and Weerakkody (2010), who noted the decision to use the online services among the citizens merely relied on the positive feedback among their social networks.

However, a study by Aziz and Idris (2012) found that Social Influence only significant on the early stage of its implementation and turn to be non-significant as the citizen familiar with the services. It implies that once the citizen become familiar with the service, opinion from othes have no effect on the usage. In this study, as the study selected the respondents based on the IRBM database, it was assumed that the respondents had knowledge on the online service (e-

filing), and that was the strong reason for Social Influence not to be associated with e-filing. Furthermore, as shown in Table 6-1, experience was found to be related with e-filing use, whereas the Social Influence predictor was not associated. For example, the studies by Al-Athmay, Fantazy and Kumar (2016) and Bélanger and Carter (2008) found that the effect of peers' influence decreased as experience on technology increased. It means as the users became familiar with the system, Social Influence less likely affected the citizens' decision to use the online services.

Finally, based on the research findings, only Perceived Trust was found not to be associated with any service under studies. Perceived Trust has been widely discussed in the previous literature, but there is still no agreed definition on it. To recall, in this study, Perceived Trust is defined as the citizens' belief that the e-government services will perform to reduce the complexity and uncertainty of living environment (Alsaghier et al., 2009) that can be trusted by providing a safe and secure system for the citizens' personal details (Mayer, Davis, & Schoorman, 1995). As shown in Table 6-1, in this study, one possible explanations for these results may be related to the pattern of use that was influenced by another factor, as explained by Colesca (2009) in his study. The author highlighted that the higher were the levels of trust, the lower was the level of citizens' risk perceptions on e-government. For example, in the e-filing service, Perceived Risk was supported but not for Perceived Trust, and it was found to be similar with e-assessment service. The result of this study indicated the citizens perceived the Effort Expectancy, Social Influence and Relative Advantage in e-government as rather positive, and offered the inverse result for Perceived Risk in determining the citizens' use on e-government services (Horst et al., 2007).

6.3 Implications of the Study

This section discusses the empirical and practical contributions to the existing body of knowledge on e-government use. These contributions are presented in the following subsections.

6.3.1 Academic Implications

At the heart of this body of research is a model that seeks to understand and predict usage of e-government by citizens, namely UTAUT model. Most existing e-government studies (e.g., AlAwadhi & Morris, 2008; Marchewka, Liu, & Kostiwa, 2007; Rahman et al., 2011) focused

on one e-government service, thus the comparative analysis was lacking. Therefore, this present empirical research contributed to the body of knowledge as this study integrated the UTAUT model with several e-government services, and a variation on citizens' pattern of usage in different setting of systems was identified.

The findings revealed that the service provider (government agency) should treat their services accordingly. For example, in traffic fines service, Perceived Risk was not associated with e-information and e-payment services. However, the usage of both services was influenced by peer's opinion as an important factor, regardless of whether it was an information or transaction service. Apart from being concerned about Relative Advantage of e-services, it is advisable for the government to look into the Social Influence factor, as the result of this study implied the importance of such a factor particularly for new services. Second, the interviews proposed two constructs that were obtained from the scoping study, and it can be used to measure the factors that influenced the citizens' use of e-government services. Unlike the previous studies that successfully proved that the UTAUT model was validated to investigate the technology adoption from different perspectives including behavioural intentions (AlAwadhi & Morris, 2008), management effectiveness (Abdulwahab & Dahalin, 2010), information quality and service quality (Rahman et al., 2011), this study integrated the UTAUT model with Perceived Risk and Perceived Trust to examine the key determinants on e-government use with different setting of e-services. As a result, the integration of both constructs to the UTAUT model was successfully proven when Perceived Risk construct was found to be significant on the property tax and traffic fines systems. The result implied that the UTAUT model is not comprehensive on its own where other factor (Perceived Risk) also was found to be associated on e-government use. The adapted model that included six types of e-government services can be used to enrich the understanding on theoretical development in the context of e-government use by shedding the light on the reasons the citizen chose to use some e-government services and not others.

Finally, another contribution of the present study was related to the methodology, more specifically the opportunity to know the patterns of the citizens' use by comparing different types of e-government services in a single study by using the same data collected from the same period. The present study identified various factors associated with citizens' use from three different settings of services namely income tax, property tax, and traffic fines. By considering the different features of the systems and the different user needs that may influence

the usage of technology, the present study also discussed a list of predictors considered to be important by the citizens when engaging with e-government services.

6.3.2 Practical Implications

The findings of this research have practical implications for e-government design and deployment. The research identified the main determinants leading to users' decision making to adopting e-government services. The adoption rate of e-government services in most developing countries is very low (Heeks, 2006; M. Kaur & Singh, 2015). Thus, by identifying this main determinant of use, it could bring out a new dimension to e-government implementation. In the current study, the interviews that emphasised the collaboration between government and private sectors (local banks) in the traffic fines system had brought a new paradigm to the e-government delivery service. The findings are expected to help the government acquire an understanding on the dominant factors that encourage the usage of e-government service among the citizens. By collaborating the online payment system with several local banks, it was found to be positively associated with e-government use. Therefore, such initiatives that well planned by government are identify to have helped to streamline with the technology and contribute to increase the usage by the citizens (Siddiquee, 2008).

Practically, to increase citizens' use of e-government services, the service providers have to make sure that the services provided are useful and accessible (Adams et al., 2012; Al-Khalifa, 2010). For instance, regardless of the type of services, based on the findings, Effort Expectancy and Perceived Risk were found to be associated with e-government use. Thus, to engage the citizen, it is crucial for the government agencies to understand the important determinants that lead to the usage of e-government services. However, in this study, it was found that there was a pattern of usage on e-government services. For example, Effort Expectancy and Perceived Risk were identified associated with income tax and property tax services, while Social Influence only related to the traffic fines services. Thus, governments have to conduct a research that identifies the determinants of user acceptance by identifying the right solution as well as to design the ways to increase citizen acceptance of e-government. This is because the governments in developing countries have limited resources, and the success of e- government is a must to ensure that the resources allocated and spent are not taken for granted.

6.4 Limitations of the study

Similar with all studies, this study was also a subject to the limitations that could potentially influence the conclusions. First, because this case study was conducted in Malaysia and the respondents were recruited from the Malaysian Tax Office's database, the findings might not be generalised. This study was conducted in the Malaysian context, so the analysis was based on the perception of the Malaysian citizens as one of developing country. Thus, the interpretation of the results should only be applicable to the Malaysian e-government setting (Hussein et al., 2007). Therefore, whether the results would be consistent with the results from other countries, it would need to be confirmed in the further studies.

Second, the participants on the scoping study stage were selected based on purposive and snowballing sampling, and only included those with an experience with e-government services. Due to time constraint, this study was not able to reach the people who were excluded from the scoping study, whereas acquiring information from these people was also important because they may have some different points or views on the proposed predictors towards e-government use. Therefore, further verification to enhance the findings from the scoping study is needed in future.

Third, due to the voluntary nature of the respondents to involve in the study, it was difficult to obtain a large number of returned questionnaires. The drawbacks of using an online survey were also expected in this study. The researcher faced withdrawals by the respondents in the early and middle stages of the survey.

Finally, regarding the test setting and the measurement of the variables, as mentioned above, this study used the sample from the Malaysian Tax Office's database. As the study focused on six major systems used in the e-government context, a variety of characteristics of the systems perhaps led to the different settings for testing and measurement. Because of this limitation, the results about the predictors that influenced the citizens' usage of e-government services may not be generalised as some of the services were not relevant to some users in the first place. Thus, future studies should consider a longitudinal approach to further explore these factors.

6.5 Future Studies

Firstly, future studies may also further explore the other types of government relationships as they also possibly influence the citizens' decision making on usage of the technology. As this present study focused on the end-users' perceptions (G2C), G2B and G2G were ignored although the previous studies found that these types of relationship are also important in the development of e-government services (Abdul Karim, 2003; Hung et al., 2006; WASEDA, 2012). Therefore, further studies are highly recommended to include these types of relationship and and test the factors with the different e-services to determine the citizens' intention to use of e-government services. (Ghani & Said, 2010; Hassan & Palil, 2012; Hossan et al., 2006).

Secondly, this present study used only a dichotomous scale-item to measure the actual use. Additional studies are needed to explore the impact of the study when multiple items are used to measure the primary dimension of actual usage. It would be interesting to further examine when the multiple items are used to measure the actual use from different e-government services. However, most of the studies only tested with single e-government service (Ambali, 2009; Hong, 2012; Lean et al., 2009). Therefore, due to limited numbers of study that measure the actual use with multiple items and tested with several e-government services, future research should be conducted to enhance the findings. Thirdly, longitudinal studies may be required in the future studies in order to understand the citizens' adoption in depth by looking whether the citizen will repeat or continue the online services after the initial adoption.

Finally, the respondents of this study were selected based on a purposive sampling, and only the citizens who were currently available in the IRBM database were included. Using this type of respondents was worthwhile particularly to investigate the usage of different e- services and their impact on the proposed constructs towards the actual usage of e-services. The interpretation of result should only be confined to the Malaysian e-government setting. However, further studies are encouraged to be conducted in different settings to verify this research findings.

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Appendix A

INTERVIEW GUIDE:

General use of online government services

1. In the past 3 years what online government services have you used?
2. When deciding whether to use an online government service, what key factors do you take into account?
3. Online government services can be classified into four different categories: obtain general information; obtaining specific information about me; making transactions, such as applying for a license or benefit, or providing information to government; or paying government bills, such as taxes. Thinking about the way in which you tend to use online government services, do these different types of services make a difference to the whether you choose to go online or use a different method?

Income taxes

I want to now talk about three different government websites and your use of them. First is an income tax. The government website allows you to file your income tax return, and also to pay any outstanding taxes.

1. Did you know that your income tax forms can be accessed and paid through online?
2. Have you used this service in the past 3 years? What are the reasons for you choosing to use or not use this service?
3. If you have used the service:
    a) What made you first use this online service?
    b) What was your first impression of e-filing? Why do you say that?
    c) Do you think e-filing is useful? How?
    d) Do you believe that e-filing services are easy to use? How about the website quality?

Land tax

Secondly, I want to talk about the land tax (e-assessment) that provided by the local authority. Also, the local authority websites allows you to file your land tax return, and also to pay any outstanding taxes.

1. Did you know that your land tax forms can be accessed and paid through online?
2. Have you used this service in the past 3 years? What are the reasons for you choosing to use or not use this service?
3. If you have used the service:
    a) What made you first use this online service?
    b) What was your first impression of e-assessment? Why do you say that?
    c) Do you think e-assessment is useful? How?
    d) Do you believe that e-assessment services are easy to use? How about the website quality?

Traffic fines and drivers licensing

Now I want to talk about the traffic fines and drivers licensing. The government websites also allows you to file and pay your traffic fines and drivers licensing through online.

1. Did you know that your traffic fines and drivers licensing can be accessed and paid through online?

2. Have you used this service in the past 3 years? What are the reasons for you choosing to use or not use this service?
3. If you have used the service:
    a) What made you first use these online services?
    b) What was your first impression of these online services? Why do you say that?
    c) Do you think these online services are useful? How?
    d) Do you believe that these online services are easy to use? How about the website quality?

General

1. Do you believe that online government websites are trustworthy and your data is secure? Why?
2. Do you believe that people around you are important to influence your behaviour on online government services usage? How and why?
3. If you are using another method to deal with a government agency, what is the method? Why are using it?
4. In summary, what do you think about online government services?
5. Anything else you want to add/share about use of Malaysia online government services?

Demographic

1. Gender: ( ) Female ( ) Male
2. Age: ( ) 20 or under ( ) 21- 30 ( ) 31- 40 ( ) 41 -50 ( ) 51 or above
3. Highest level of education:
   ( ) High school and below ( ) Diploma ( ) Bachelor ( ) Master/PhD
4. Type of employment:
   ( ) Public sector ( ) Private Sector ( ) Own business
5. How do you describe your general computer knowledge?
   ( ) Very poor ( ) Poor ( ) Moderate ( ) Good ( ) Very good
6. How would you describe your Internet knowledge?
   ( ) Very poor ( ) Poor ( ) Moderate ( ) Good ( ) Very good
7. How long have you been using the Internet?_____
8. How often do you use the Internet per day?_____

Appendix B

THE UNIVERSITY OF QUEENSLAND
AUSTRALIA

The School of Social Work and Human Services
Head of School
Professor Howard Karger
Deputy Head of School
Dr Rose Melville
CRICOS PROVIDER NUMBER 00025B

To: Mr M. Wallang
By email

11/2/14

Dear Mr Wallang

Re: Determinants that influence an individual's usage of different e-government systems: A Malaysian case study

Clearance Number: SWAHS2014/1

The School Research Ethics Committee has reviewed and approved your application for ethical clearance for the above named research project.

Please note that:

- Clearance will normally be for the duration of the project unless otherwise stated;
- Adverse reaction or any other incident affecting the welfare and/or health of subjects attributable to the research should be promptly reported to the Head of School and director of the School Research Ethics Committee;
- Amendments to any part of the approved protocol, documents or questionnaires attached to this clearance are to be submitted to the School Research Ethics Committee for approval.

Students and supervisors are also encouraged to contact either the University Ethics Officer (3365 3924) or Chair/members of the School Research Ethics Committee (07 3365 1847) on other ethical issues concerning the conduct of the research throughout the course of the study. We wish you all the best with your research.

Yours Sincerely
K Healy.
Professor Karen Healy
Director of Research
k.healy@uq.edu.au

Appendix C

THE UNIVERSITY OF QUEENSLAND
AUSTRALIA

The School of Social Work and Human Services
Head of School
Professor Howard Karger
Deputy Head of School
Dr Rose Melville
CRICOS PROVIDER NUMBER 00025B

To: Muslimin Wallamg

Muslimin W <muslimin.uum@gmail.com>

Date: 27.02.2015

Dear Muslimin

Re: Determinants that influence an individual's usage of different e-government systems: a Malaysian case study

Clearance Number: NMSW 2015/01

The School Research Ethics Committee has reviewed and approved your application for ethical clearance for the above named research project.

Please note that:

- Clearance will normally be for the duration of the project unless otherwise stated;
- Adverse reaction or any other incident affecting the welfare and/or health of subjects attributable to the research should be promptly reported to the Head of School and director of the School Research Ethics Committee;
- Amendments to any part of the approved protocol, documents or questionnaires attached to this clearance are to be submitted to the School Research Ethics Committee for approval.

Students and supervisors are also encouraged to contact either the University Ethics Officer (3365 3924) or Chair/members of the School Research Ethics Committee (07 3365 1254) on other ethical issues concerning the conduct of the research throughout the course of the study. We wish you all the best with your research.

Yours Sincerely

Professor Jill Wilson
Director of Research
wilsonj@uq.edu.au

Appendix D

THE UNIVERSITY OF QUEENSLAND
AUSTRALIA

PARTICIPANT INFORMATION SHEET

Section A
Determinants that influence the citizens' usage of different e-government systems: A Malaysian case study

Introduction and purpose of the study
You are being invited to participate in this research study about Malaysian's use of e-government services.

This study is organised and conducted by the researcher – Muslimin Wallang, as a requirement for his Ph.D. at The University of Queensland.

What is the aim of this study?
The purpose of this research is to examine the reasons why citizen's use or do not use different e-government services.

What does the study involve?
You will be asked to fill out an online survey that asks some questions about your e-government usage experience. This is expected to take between 20 and 30 minutes. Your responses will be anonymous and confidential. No personally identifying data are collected. The data from the study will be used in research publications and conference presentations. However, your identity will not be disclosed in any way in these publications or reports.

This is an independent study. The IRBM is not involved in any other way in the study, and your participation is entirely voluntary and your involvement in the study will not be reported to IRBM. If you agree to participate, no personally identifying information will be collected. Additionally, your computer IP address will not be collected. Your participation in the research will be kept confidential.

The main findings of this study will not be reporting to the participants as the researcher does not know about who participated in the survey.

What are my rights and how will they be protected?
As a volunteer in this study you can withdraw at any time. You do not need to say why you are withdrawing and it will not incur a penalty. The information that you provide will be used in this study only and your identity will not be made available to any other party. You have the right to ask questions at any time and details about how you can contact the researcher are available below.

All information collected will be kept strictly confidential, and no one including the researchers will know who you are. The information will be kept in a secure place at The University of Queensland and will be secured electronically by password.

This study has been cleared by one of the human ethics committees of the University of Queensland in accordance with the National Health and Medical Research Council's guidelines. You are, of course, free to discuss your participation in this study with project staff (contactable on (+61) 733651252). If you would like to speak to an officer of the University not involved in the study, you may contact:

Research Ethics Officer
Office of Research and Postgraduate Studies
Level 1, Cumbrae-Stewart Building
Research Road
The University of Queensland
St Lucia, QLD 4072
Ph (+61) 73365 3924

Thank you for your assistance with this research study.

Muslimin Wallang
PhD Student
University of Queensland
muslimin.uum@gmail.com
Phone: (+61) 405759341

I have read the Participant Information Sheet and agree to continue to the next page to view the Consent Form.

	Yes
	No

PARTICIPANT CONSENT

I have been informed about the nature and purpose of the research, and my involvement in the study.

I hereby give my consent to be involved in this project. By selecting the 'YES' button I acknowledge that:

□ I have read and understood the Participant Information.

□ I understand what is required of me by agreeing to be involved.

□ I understand that all information collected is confidential and I will not be identified in any information published from this study.

□ Only research team personnel will have access to my survey data.

□ I understand that taking part in this study is voluntary and that I am free to withdraw without penalty at any time.

□ There is no direct benefit for me in participating in the study.

I consent to participate in the project:

☐ Yes
☐ No - thank you for your time

Section B
Income Tax

Most Malaysian citizens are required to pay income tax. An internet-based income tax system enables tax payers to electronically lodge their income tax return (called **'e-filing'**) and to electronically pay their income tax bill (called **'e-payment'**) through the internet. Citizens can access the income tax online system at https://spsd.hasil.gov.my/PKI/e/mainpage.html

During the last two years, have you visited the IRBM website?

☐ Yes
☐ No

Did you know that you can ***lodge*** your income tax return online?

☐ Yes
☐ No

Did you know that you can ***pay*** your income tax return online?

☐ Yes
☐ No

In the last two (2) years, did you need to lodge a tax return?

☐ Yes
☐ No – **[GO TO SECTION C]**

The following statements refer to your attitudes about **lodging your income tax return**. Please select your response for each of the statements using the scale from 1 to 5. 1 indicates "strongly disagree" and 5 indicates "strongly agree".

No	Statement	strongly disagree				strongly agree
1	Compared to lodging my tax return over the counter, I think that lodging my income tax return online would be quicker.	1	2	3	4	5
2	The disadvantages of lodging an income tax return online far outweigh the advantages.	1	2	3	4	5

3	Compared to lodging my tax return over the counter, I think that lodging my income tax return online would be easier.	1	2	3	4	5
4	I would find it easy to lodge an income tax return online.	1	2	3	4	5
5	It is easy for me to learn to lodge an income tax online.	1	2	3	4	5
6	Lodging my tax return online would be clear and understandable.	1	2	3	4	5
7	People who are important to me think that I should lodge my income tax return online.	1	2	3	4	5
8	I read/saw advertisements that lodging an income tax return online is a good way to interact with the income tax office.	1	2	3	4	5
9	IRBM encourages citizens to lodge their income tax return online.	1	2	3	4	5
10	There is a considerable risk involved in lodging an income tax return online.	1	2	3	4	5
11	Overall, it is not safe to transmit sensitive information by lodging an income tax return online.	1	2	3	4	5
12	Lodging an income tax return online would take too much time.	1	2	3	4	5
13	I am confident that it is safe and secure to lodge an income tax return online.	1	2	3	4	5
14	IRBM can be trusted to process online tax returns reliably.	1	2	3	4	5
15	I am more comfortable lodging my income tax return with someone rather than online.	1	2	3	4	5

In the past two (2) years, did you lodge your income tax return online?

☐ Yes
☐ No

The following statements refer to your attitudes about **paying your income tax bill.** Please select your response for each of the statements using the scale from 1 to 5. 1 indicates "strongly disagree" and 5 indicates "strongly agree".

No	Statement	strongly disagree				strongly agree
1	Compared to paying my tax return over the counter, I think that paying my income tax online would be quicker.	1	2	3	4	5
2	The disadvantages of paying an income tax return online far outweigh the advantages.	1	2	3	4	5
3	Compared to paying my tax return over the counter, I think that paying an income tax return online would be easier.	1	2	3	4	5

4	I would find it easy to pay an income tax return online.	1	2	3	4	5
5	It is easy for me to learn to pay income tax online.	1	2	3	4	5
6	Paying my tax return online would be clear and understandable.					
7	People who are important to me think that I should pay my income tax bill online.	1	2	3	4	5
8	I read/saw advertisements that paying an income tax online is a good way to interact with the income tax office.	1	2	3	4	5
9	IRBM encourages citizens to pay their income tax online.	1	2	3	4	5
10	There is a considerable risk involved in paying an income tax bill online.	1	2	3	4	5
11	Overall, it is not safe to transmit sensitive information by paying an income tax online.	1	2	3	4	5
12	Paying an income tax online would take too much time.	1	2	3	4	5
13	I am confident that it is safe and secure to pay an income tax return online.	1	2	3	4	5
14	IRBM can be trusted to process online tax payments reliably.	1	2	3	4	5
15	I am more comfortable paying my income tax return with someone rather than online.	1	2	3	4	5

In the past two (2) years, did you pay your income tax bill online?

☐ Yes
☐ No

Section C
Property Tax

All Malaysian's who own property have to pay Property Tax (each year) to the local authority. Local authority websites now allow people to find out how much they have to pay online (called **'e-assessment'**) and to pay the amount of property tax owed online (called **"e-payment"**).

During the last two years, have you visited your local authority website?

☐ Yes
☐ No

Did you know that you can ***assess*** your property tax return online?

☐ Yes
☐ No

Did you know that you can ***pay*** your property tax return online?

☐ Yes
☐ No

At any point in the last two (2) years have you owned any property that is subject to property tax?

☐ Yes
☐ No – **[GO TO SECTION D]**

The following statements refer to your attitudes about **assessing your property tax liability**. Please select your response for each of the statements using the scale from 1 to 5. 1 indicates "strongly disagree" and 5 indicates "strongly agree".

No	Statement	strongly disagree				strongly agree
1	Compared to assessing my property tax over the counter, I think that assessing my property tax liability online would be quicker	1	2	3	4	5
2	The disadvantages of assessing the property tax liability online far outweigh the advantages.	1	2	3	4	5
3	Compared to assessing my property tax over the counter, I think that assessing the property tax liability online would be easier.	1	2	3	4	5
4	I would find it easy to assess the property tax liability online.	1	2	3	4	5
5	It is easy for me to learn to assess the property tax liability online.	1	2	3	4	5
6	Assessing my property tax liability online would be clear and understandable.	1	2	3	4	5
7	People who are important to me think that I should assess my property tax liability online.	1	2	3	4	5
8	I read/saw advertisements that assessing the property tax liability online is a good way to interact with the local authority office.	1	2	3	4	5
9	Local authority office encourages citizens to assess their property tax liability online.	1	2	3	4	5
11	There is a considerable risk involved in assessing the property tax liability online.	1	2	3	4	5
11	Overall, it is not safe to transmit sensitive information by assessing the property tax liability online.	1	2	3	4	5
12	Assessing the property tax liability online would take too much time.	1	2	3	4	5
13	I am confident that it is safe and secure to assess the property tax online.	1	2	3	4	5
14	Local authority can be trusted to process online property tax reliably.	1	2	3	4	5
15	I am more comfortable assessing my property tax with someone rather than online.	1	2	3	4	5

In the past two (2) years, have you ever assessed your property tax liabilities online?

☐ Yes
☐ No

The following statements refer to your attitudes about **paying your property tax**. Please select your response for each of the statements using the scale from 1 to 5. 1 indicates "strongly disagree" and 5 indicates "strongly agree".

No	Statement	strongly disagree				strongly agree
1	Compared to paying my property tax over the counter, I think that paying my property tax liability online would be quicker.	1	2	3	4	5
2	The disadvantages of paying the property tax liability online far outweigh the advantages.	1	2	3	4	5
3	Compared to paying my property tax over the counter, I think that paying the property tax liability online would be easier.	1	2	3	4	5
4	I would find it easy to pay the property tax liability online.	1	2	3	4	5
5	It is easy for me to learn to pay the property tax liability online.	1	2	3	4	5
6	Paying my property tax liability online would be clear and understandable.	1	2	3	4	5
7	People who are important to me think that I should pay my property tax liability online.	1	2	3	4	5
8	I read/saw advertisements that paying the property tax liability online is a good way to interact with the local authority office.	1	2	3	4	5
9	Local authority office encourages citizens to pay their property tax liability online.	1	2	3	4	5
10	There is a considerable risk involved in paying the property tax liability online.	1	2	3	4	5
11	Overall, it is not safe to transmit sensitive information by paying the property tax liability online.	1	2	3	4	5
12	Paying the property tax liability online would take too much time.	1	2	3	4	5
13	I am confident that it is safe and secure to pay the property tax liability online.	1	2	3	4	5
14	Local authority can be trusted to process online property tax payments reliably.	1	2	3	4	5
15	I am more comfortable paying my property tax with someone rather than online.	1	2	3	4	5

In the past two (2) years, did you pay your property tax liabilities online?

☐ Yes
☐ No

Section D
Traffic Fines

Traffic fines are the responsibility of the Royal Malaysian Police (RMP) under the Ministry of Home Affairs. Through the MyEG portal (https://www.myeg.com.my), citizens can check their traffic fines (called "summons alert") and to pay their traffic infringements (called "summons payment") online.

During the last two years, have you visited the MyEG portal website?

☐ Yes
☐ No

Did you know that you can ***check*** your traffic fines statement through MyEG portal?

☐ Yes
☐ No

Did you know that you can ***pay*** your traffic fines through MyEG portal?

☐ Yes
☐ No

At any point in the last two (2) years, have you received a traffic offence notice?

☐ Yes
☐ No – **[GO TO SECTION E]**

The following statements refer to your attitudes about **checking your traffic fines**. Please select your response for each of the statements using the scale from 1 to 5. 1 indicates "strongly disagree" and 5 indicates "strongly agree".

No	Statement	strongly disagree				strongly agree
1	Compared to checking my traffic fines over the counter, I think that checking the traffic fines online would be quicker.	1	2	3	4	5
2	The disadvantages of checking the traffic fines online far outweigh the advantages.	1	2	3	4	5
3	Compared to checking my traffic fines over the counter, I think that checking the traffic fines online would be easier.	1	2	3	4	5
4	I would find it easy to check the traffic fines online.	1	2	3	4	5
5	It is easy for me to learn to check the traffic fines online.	1	2	3	4	5
6	Checking the traffic fines online would be clear and understandable.	1	2	3	4	5
7	People who are important to me think that I should check the traffic fines online.	1	2	3	4	5

8	I read/saw advertisements that checking the traffic fines online is a good way to interact with the RMP office.	1	2	3	4	5
9	RMP encourages citizens to check their traffic fines online.	1	2	3	4	5
10	There is a considerable risk involved in checking the traffic fines online.	1	2	3	4	5
11	Overall, it is not safe to transmit sensitive information by checking the traffic fines online.	1	2	3	4	5
12	Checking the traffic fines online would take too much time.	1	2	3	4	5
13	I am confident that it is safe and secure to check the traffic fines online.					
14	MyEG can be trusted to process online traffic fines reliably.	1	2	3	4	5
15	I am more comfortable checking my traffic fines with someone rather than online.	1	2	3	4	5

In the last two (2) years, have you used the MyEG portal to check your traffic fines statement?

☐ Yes
☐ No

The following statements refer to your attitudes about **paying your traffic fines**. Please select your response for each of the statements using the scale from 1 to 5. 1 indicates "strongly disagree" and 5 indicates "strongly agree".

No	Statement	strongly disagree				strongly agree
1	Compared to paying my traffic fines over the counter, I think that paying the traffic fines online would be quicker.	1	2	3	4	5
2	The disadvantages of paying the traffic fines online far outweigh the advantages.	1	2	3	4	5
3	Compared to paying my traffic fines over the counter, I think that paying the traffic fines online would be easier.	1	2	3	4	5
4	I would find it easy to pay the traffic fines online.	1	2	3	4	5
5	It is easy for me to learn to pay the traffic fines online.	1	2	3	4	5
6	Paying the traffic fines online would be clear and understandable.	1	2	3	4	5
7	People who are important to me think that I should pay the traffic fines online.	1	2	3	4	5

8	I read/saw advertisements that paying the traffic fines online is a good way to interact with the RMP office.	1	2	3	4	5
9	RMP encourages citizens to pay their traffic fines online.	1	2	3	4	5
10	There is a considerable risk involved in paying the traffic fines online.	1	2	3	4	5
11	Overall, it is not safe to transmit sensitive information by paying the traffic fines online.	1	2	3	4	5
12	Paying the traffic fines online would take too much time.	1	2	3	4	5
13	I am confident that it is safe and secure to pay the traffic fines online.	1	2	3	4	5
14	MyEG can be trusted to process online traffic fines payments reliably.	1	2	3	4	5
15	I am more comfortable paying my income traffic fines with someone rather than online.	1	2	3	4	5

In the last two (2) years, have you used the MyEG portal to pay your traffic fines?

☐ Yes
☐ No

Section E
Background

Please tick the box that matches your status.

1. Sex: ( ) Female ( ) Male

2. Age: _____ years

3. Type of employment:
   ( ) Public sector ( ) Private Sector ( ) Own business
   ( ) Other (please specify); _____

4. Ethnicity
   ( ) Malays ( ) Chinese ( ) Indian ( ) other (please specify); _____

5. The district that best describes your location is:_____

6. Your local authority:_____

7. How would you describe your general computer knowledge?
   ( ) Very poor ( ) Poor ( ) Moderate ( ) Good ( ) Very good

8. How would you describe your Internet knowledge?
   ( ) Very poor ( ) Poor ( ) Moderate ( ) Good ( ) Very good

9. How long have you been using the Internet?
( ) Less than 5 yrs. ( ) 6–10 yrs. ( ) 11- 15 yrs. ( ) More than 15 yrs.

10. On average, how long do you use the Internet per day?
( ) Less than 1 hour ( ) 1–2 hrs ( ) 3–4 hrs ( ) More than 4 hrs

11. Do you have internet connection at home?
☐ Yes
☐ No

12. Do you use the internet at work?
☐ Yes
☐ No

Appendix E

Table E-1: Details on items

Item	Number of cases	Mean	S.D	Number of missing	Percentage of missing
Income tax					
TinfRA1	314	4.64	0.721	0	0.0
TinfRA3	314	4.59	0.804	0	0.0
TinfRA2	311	2.46	1.357	3	1.0
TinfEE3	312	4.29	0.809	2	0.6
TinfEE2	311	4.18	0.709	3	1.0
TinfEE1	312	4.28	0.746	2	0.6
TinfSI1	312	4.09	0.879	2	0.6
TinfSI2	314	4.05	0.896	0	0.0
TinfSI3	313	4.21	0.793	1	0.3
TinfRisk1	311	2.95	1.107	3	1.0
TinfRisk3	312	2.08	0.871	2	0.6
TinfRisk2	313	2.34	0.928	1	0.3
TinfTrust3	308	2.33	1.021	6	1.9
TinfTrust2	310	4.12	0.718	4	1.3
TinfTrust1	312	4.02	0.869	2	0.6
TpyRA1	312	4.49	0.686	2	0.6
TpyRA3	313	4.44	0.788	1	0.3
TpyRA2	312	2.46	1.262	2	0.6
TpyEE3	312	4.18	0.771	2	0.6
TpyEE2	312	4.14	0.656	2	0.6
TpyEE1	309	4.19	0.666	5	1.6
TpySI1	310	4.06	0.773	4	1.3
TpyySI2	313	4.05	0.828	1	0.3
TpySI3	310	4.14	0.878	4	1.3
TpyRisk1	313	2.89	1.034	1	0.3
TpyRisk3	310	2.18	0.887	4	1.3
TpyRisk2	311	2.31	0.964	3	1.0
TpyTrust3	311	2.37	1.031	3	1.0
TpyTrust2	309	4.05	0.680	5	1.6
TpyTrust1	312	3.95	0.823	2	0.6
Property Tax					
PinfRA1	314	3.95	0.815	0	0.0
PinfRA3	312	3.86	0.825	2	0.6
PinfRA2	314	2.84	1.061	0	0.0
PinfEE3	312	3.66	0.769	2	0.6
PinfEE2	313	3.64	0.805	1	0.3
PinfEE1	310	3.70	0.782	4	1.3
PinfSI1	313	3.54	0.804	1	0.3
PinfSI2	314	3.44	0.885	0	0.0
PinfSI3	313	3.35	0.984	1	0.3
PinfRisk1	310	3.19	0.925	4	1.3
PinfRisk3	310	2.54	0.851	4	1.3
PinfRisk2	310	2.94	0.970	4	1.3

PinfTrust3	309	2.90	1.051	5	1.6
PinfTrust2	313	3.62	0.715	1	0.3
PinfTrust1	311	3.55	0.780	3	1.0
PpyRA1	311	4.08	0.777	3	1.0
PpyRA3	313	3.90	0.934	1	0.3
PpyRA2	313	2.69	1.061	1	0.3
PpyEE3	312	3.78	0.812	2	0.6
PpyEE2	311	3.77	0.885	3	1.0
PpyEE1	313	3.86	0.831	1	0.3
PpySI1	310	3.70	0.882	4	1.3
PpySI2	313	3.54	0.967	1	0.3
PpySI3	312	3.49	1.028	2	0.6
PpyRisk1	313	3.24	0.933	1	0.3
PpyRisk3	313	2.48	0.916	1	0.3
PpyRisk2	310	2.85	1.035	4	1.3
PpyTrust3	314	2.94	1.163	0	0.0
PpyTrust2	313	3.63	0.865	1	0.3
PpyTrust1	311	3.60	0.909	3	1.0
Traffic Fines					
FinfRA1	314	4.24	0.660	0	0.0
FinfRA3	314	4.13	0.826	0	0.0
FinfRA2	312	2.80	1.157	2	0.6
FinfEE3	314	3.94	0.780	0	0.0
FinfEE2	313	3.98	0.704	1	0.3
FinfEE1	313	4.00	0.727	1	0.3
FinfSI1	311	3.81	0.790	3	1.0
FinfSI2	314	3.77	0.799	0	0.0
FinfSI3	313	3.76	0.794	1	0.3
FinfRisk1	314	3.09	0.951	0	0.0
FinfRisk3	314	2.49	0.916	0	0.0
FinfRisk2	313	2.88	0.943	1	0.3
FinfTrust2	312	2.84	1.058	2	0.6
FinfTrust3	313	3.79	0.744	1	0.3
FinfTrust1	312	3.70	0.803	2	0.6
FpyRA1	313	4.11	0.725	1	0.3
FpyRA3	313	3.95	0.861	1	0.3
FpyRA2	313	2.74	1.089	1	0.3
FpyEE3	310	3.91	0.759	4	1.3
FpyEE2	312	3.94	0.799	2	0.6
FpyEE1	310	3.87	0.879	4	1.3
FpySI1	312	3.79	0.858	2	0.6
FpySI2	311	3.77	0.837	3	1.0
FpySI3	310	3.67	0.912	4	1.3
FpyRisk1	313	3.15	0.959	1	0.3
FpyRisk3	312	2.50	0.941	2	0.6
FpyRisk2	311	2.88	0.989	3	1.0
FpyTrust3	311	3.03	1.122	3	1.0
FpyTrust2	312	3.85	0.726	2	0.6
FpyTrust1	312	3.76	0.900	2	0.6

Appendix F

Table F-1: Factor loading and reliability of the scaled items income tax systems.

System	Variable	Item	Factor loading	Eigenvalue	Variance explained	Cronbach's alpha
Income Tax E-filing	Relative Advantage	TinfRA1	0.91	1.66	56%	0.77
		TinfRA3	0.90			
	Effort expectancy	TinfEE1	0.84	2.24	75%	0.83
		TinfEE2	0.90			
		TinfEE3	0.85			
	Social Influence	TinfSI1	0.83	1.97	66%	0.74
		TinfSI2	0.87			
		TinfSI3	0.72			
	Perceived Risk	TinfRISK1	0.63	1.98	66%	0.72
		TinfRISK2	0.86			
		TinfRISK3	0.91			
	Perceived Trust	TinfTRUST1	0.94	1.77	59%	0.86
		TinfTRUST2	0.93			
Income Tax E-payment	Relative Advantage	TpyRA1	0.92	1.74	58%	0.83
		TpyRA3	0.91			
	Effort Expectancy	TpyEE1	0.81	2.11	70%	0.79
		TpyEE2	0.89			
		TpyEE3	0.80			
	Social Influence	TpySI1	0.80	2.15	72%	0.81
		TpySI2	0.89			
		TpySI3	0.84			
	Risk	TpyRISK1	0.77	2.19	73%	0.82
		TpyRISK2	0.91			
		TpyRISK3	0.87			
	Trust	TpyTRUST1	0.88	1.65	55%	0.77
		TpyTRUST2	0.89			

Table F-2: Factor loading and reliability of the scaled items for property tax systems.

System	Variable	Item	Factor loading	Eigenvalue	Variance explained	Cronbach's alpha
Property Tax e-Assessment	Relative Advantage	PinfRA1	0.94	1.75	55%	0.85
		PinfRA3	0.92			
	Effort Expectancy	PinfEE1	0.95	2.71	90%	0.94
		PinfEE2	0.96			
		PinfEE3	0.93			
	Social Influence	PinfSI1	0.82	2.21	74%	0.82
		PinfSI2	0.91			
		PinfSI3	0.84			
	Risk	PinfRISK1	0.82	1.93	64%	0.73
		PinfRISK2	0.84			
		PinfRISK3	0.74			
	Trust	PinfTRUST1	0.92	1.99	66%	0.86
		PinfTRUST2	0.89			
Property Tax E-payment	Relative Advantage	PpyRA1	0.96	1.96	66%	0.94
		PpyRA3	0.95			
	Effort expectancy	PpyEE1	0.94	2.69	89%	0.94
		PpyEE2	0.96			
		PpyEE3	0.94			

	Social Influence	PpySI1	0.82	2.25	75%	0.84
		PpySI2	0.87			
		PpySI3	0.89			
	Risk	PpyRISK1	0.79	2.00	67%	0.75
		PpyRISK2	0.89			
		PpyRISK3	0.74			
	Trust	PpyTRUST1	0.91	1.96	66%	0.87
		PpyTRUST2	0.89			

Table F-3: Factor loading and reliability of the scaled items for traffic fines systems.

System	Variable	Item	Factor loading	Eigenvalue	Variance explained	Cronbach's alpha
Traffic Fines- e-checking	Relative Advantage	FinfRA1	0.95	1.85	62%	0.90
		FinfRA3	0.93			
	Effort Expectancy	FinfEE1	0.95	2.63	88%	0.93
		FinfEE2	0.94			
		FinfEE3	0.92			
	Social Influence	FinfSI1	0.87	2.32	77%	0.86
		FinfSI2	0.93			
		FinfSI3	0.84			
	Risk	FinfRISK1	0.81	1.91	64%	0.71
		FinfRISK2	0.86			
		FinfRISK3	0.72			
	Trust	FinfTRUST1	0.91	1.76	59%	0.84
		FinfTRUST2	0.90			
Traffic Fines E-payment	Relative Advantage	FpyRA1	0.95	1.99	67%	0.93
		FpyRA3	0.91			
	Effort Expectancy	FpyEE1	0.93	2.65	88%	0.94
		FpyEE2	0.92			
		FpyEE3	0.95			
	Social Influence	FpySI1	0.88	2.19	73%	0.82
		FpySI2	0.89			
		FpySI3	0.78			
	Risk	FpyRISK1	0.82	2.05	68%	0.77
		FpyRISK2	0.89			
		FpyRISK3	0.77			
	Trust	FpyTRUST1	0.94	1.86	62%	0.89
		FpyTRUST2	0.95			

Appendix G

Income Tax (e-Filing) – PCA/ Varimax

Table G-1: KMO and Bartlett's test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.835
Bartlett's Test of Sphericity	Approx. Chi-Square	1459.918
	df	105
	Sig.	.000

Table G-2: Total variance explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.353	35.687	35.687	5.353	35.687	35.687	3.096	20.641	20.641
2	1.784	11.895	47.583	1.784	11.895	47.583	2.491	16.608	37.250
3	1.337	8.915	56.497	1.337	8.915	56.497	2.111	14.077	51.326
4	1.164	7.760	64.257	1.164	7.760	64.257	1.940	12.930	64.257
5	.800	5.332	69.589						
6	.781	5.204	74.793						
7	.684	4.563	79.356						
8	.606	4.042	83.398						
9	.515	3.431	86.829						
10	.462	3.077	89.906						
11	.385	2.565	92.470						
12	.357	2.379	94.849						
13	.346	2.305	97.155						
14	.233	1.555	98.710						
15	.194	1.290	100.000						

Extraction Method: Principal Component Analysis.

Appendix H

Table H-1: Multicollinearity test – Actual usage on information

Service	Constructs	Tolerance	VIF
Income tax system – e-filing	Relative Advantage	0.498	2.008
	Effort expectancy	0.641	1.560
	Social Influence	0.761	1.313
	Perceived Risk	0.614	1.628
	Perceived Trust	0.484	2.066
Income tax system – e-payment	Relative Advantage	0.394	2.537
	Effort expectancy	0.524	1.910
	Social Influence	0.648	1.542
	Perceived Risk	0.550	1.817
	Perceived Trust	0.584	1.714
Property tax system – e-assessment	Relative Advantage	0.579	1.728
	Effort expectancy	0.552	1.813
	Social Influence	0.651	1.536
	Perceived Risk	0.474	2.110
	Perceived Trust	0.388	2.576
Property tax system – e-payment	Relative Advantage	0.381	2.625
	Effort expectancy	0.568	1.761
	Social Influence	0.340	2.943
	Perceived Risk	0.325	3.073
	Perceived Trust	0.574	1.742
Traffic fine system – e-checking	Relative Advantage	0.623	1.605
	Effort expectancy	0.636	1.572
	Social Influence	0.641	1.561
	Perceived Risk	0.607	1.647
	Perceived Trust	0.447	2.239
Traffic fine system – e-payment	Relative Advantage	0.419	2.389
	Effort expectancy	0.642	1.558
	Social Influence	0.591	1.692
	Perceived Risk	0.350	2.854
	Perceived Trust	0.364	2.750

Appendix I

Table I-1: Spearman correlation for e-filing service in income tax system

	Relative Advantage	Effort expectancy	Social Influence	Perceived Risk	Perceived Trust
Relative Advantage	1				
Effort expectancy	.577**	1			
Social Influence	.355**	.540**	1		
Perceived Risk	.158**	.288**	.204**	1	
Perceived Trust	.503**	.486**	.480**	.422**	1

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table I-2: Spearman correlation for e-payment service in income tax system

	Relative Advantage	Effort expectancy	Social Influence	Perceived Risk	Perceived Trust
Relative Advantage	1				
Effort expectancy	.322**	1			
Social Influence	.189**	.469**	1		
Perceived Risk	.269**	.276**	.211**	1	
Perceived Trust	.362**	.481**	.541**	.413**	1

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table I-3: Spearman correlation for e-assessment service in property tax system

	Relative Advantage	Effort Expectancy	Social Influence	Perceived Risk	Perceived Trust
Relative Advantage	1				
Effort Expectancy	.314**	1			
Social Influence	.214**	.599**	1		
Perceived Risk	.382**	.226**	.171*	1	
Perceived Trust	.442**	.584**	.468**	.527**	1

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table I-4: Spearman correlation for e-payment service in property tax system

	Relative Advantage	Effort Expectancy	Social Influence	Perceived Risk	Perceived Trust
Relative Advantage	1				
Effort Expectancy	.641**	1			
Social Influence	.486**	.609**	1		
Perceived Risk	.358**	.316**	.299**	1	

Perceived Trust	.558**	.602**	.520**	.431**	1

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table I-5: Spearman correlation for e-checking in traffic fines system

	Relative Advantage	Effort Expectancy	Social Influence	Perceived Risk	Perceived Trust
Relative Advantage	1				
Effort Expectancy	.618**	1			
Social Influence	.519**	.496**	1		
Perceived Risk	.256**	.247**	.118	1	
Perceived Trust	.486**	.497**	.569**	.212**	1

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table I-6: Spearman correlation for e-payment in traffic fines system

	Relative Advantage	Effort Expectancy	Social Influence	Perceived Risk	Perceived Trust
Relative Advantage	1				
Effort Expectancy	.560**	1			
Social Influence	.301**	.377**	1		
Perceived Risk	.318**	.163	.099	1	
Perceived Trust	.424**	.387**	.596**	.321*	1

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).